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MILITARY RECONNAISSANCE.

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WHY REQUIRED.

IN order that a general may develop his strategical and tactical maneuvers so as to obtain a maximum advantage from the force he controls, gain the greatest probability of success, reap the greatest results from victory, and suffer the least from defeat, he must have an accurate knowledge of the terrain over which he is to operate.

It is unnecessary to point out the advantage that this knowledge of the terrain has given to our generals of the past, but the military student will at once recognize that this knowledge not only suggested the plan of campaign but regulated the length of the daily marches and pointed out the field of battle. "The secret of my success," says NAPOLEON, "is my knowledge of the terrain."

On the other hand, an absence of this knowledge, or an incorrect knowledge, has brought about many disastrous results. "The Union army, during the peninsular campaign, was turned from its objective on account of a river incorrectly mapped, and the Confederate General E. W. LAW states: 'Throughout this campaign, owing to igno-

rance of the country and lack of reconnaissances of the successive battle-fields, the Confederates were attacked just when and where the enemy desired. The real trouble was that the Confederate officers, even though high in command, knew little or nothing of the topography of the country in which they were operating.'"

The ordinary maps of the country, although partially suitable for strategical operations, are not sufficiently complete in details to give the information required for tactical and logistical maneuvers. It, therefore, devolves upon a general, in the field, to obtain this information with the time and resources at his disposal.

BY WHOM MADE.

The compilation of maps and the making of reconnaissances strictly belong to the duties of the staff officer. One of the principal duties required of a staff officer is to make himself thoroughly acquainted with the country in the vicinity of an army; more particularly with the roads, bridges, defiles and fords. This information he may obtain by the reports of others, but it is best obtained by personal observation. General WOLSELEY says: "As soon as an army takes the field, a topographical department should be formed. It should be an integral portion of the staff. All surveys and most of the reconnaissance work should be done by officers of this topographical branch. Indeed, although road reports and many of the minor reconnaissances may be made by cavalry officers, the greater and most important portion of those duties are done in nearly all armies by officers of the general staff."

NAPOLEON, in his campaigns, supervised this portion of the work himself, and entrusted only the details to his most eminent associates, such as MURAT, BERTHIER, SAVARY and BERTRAND. His orders with reference to the work were most explicit and minute, showing the great importance NAPOLEON attached to a knowledge of the terrain over which operations were to take place.

In our service, in the event of war, the work would undoubtedly fall to the lot of officers of special attainments selected from the infantry and cavalry arms, as they are more familiar with the relation of minor tactics to the terrain, and in addition, are now acquiring a high degree of proficiency in this work, while our engineer corps and staff corps are directing their attention to other matters. "It should not be forgotten," says VON SCHELLENDORF, "that to call upon officers of the special arms to take part in reconnaissances, is only affording them the greatest pleasure."

WHEN MADE.

Formerly all reconnaissances of the theater of operations were made pending or after the declaration of war. To-day, owing to the utilization of railroads for rapid concentration, the events which precede active operations follow one another too closely to admit of making reconnaissances of theaters at the last moment. "It must be done," says DERRÉCAGAIX, "in time of peace. There should henceforth be, then, as part of the general staff, a permanent traveling service for foreign countries. The officers charged with this duty should make itineraries of previously designated regions. The principal lines of invasion, corresponding to possible future campaigns, should first be studied; next, the intermediate and traverse lines; and, finally, accidents of the ground and military positions."

Our own extensive terrain is but little known, much less that of our neighbors, while hundreds of able young officers are lying idle at their posts, waiting and eager for just such work.

HOW MADE.

The work of the military topographer may be conveniently divided into:

1. The field work.
2. Finishing the sketch.

The field work involves:

1. Determination of distance.
2. Direction and relative position of objects.
3. Configuration of the ground.

These three elements are contained in every reconnaissance, whatever may be its nature.

4. Landscape sketching and photography.

1. *Determination of Distance.*

The element of time prevents the use of instruments for determining distance. The chain and tape constitute no part of the outfit of the military topographer, much less does the cumbersome base-line apparatus of the geodetic survey.

Distance must then be determined by some of the following methods:

1. Pacing.
2. Counting walks or trots of a horse.

3. By use of time scales.
4. Estimation of distance.
5. Range finders.
6. The odometer.
7. The pedometer.
8. Sound, etc.

1. *Pacing.*—The natural step alone should be used. The English endeavor to pace yards, but the topographer has enough to do with his eyes and hands without being encumbered with any additional burden.

A scale should be constructed to read hundreds of paces, not less; anything short of one hundred paces being estimated from the scale by eye.

2. *Counting Walks or Trots of a Horse.*—Most of the topographical work in the field will be done on horseback. The scale of walks, trots or canters may be used. After becoming skillful in the execution of the work at a walk, the scale of trots should invariably be used, as this is the slowest gait that will enable the topographer to get over as much ground as will be expected of him each day.

Always use the same horse for this work, and select a steady plug rather than a fretful high stepper.

Become thoroughly familiar with your horse's gaits, and bear in mind that allowances must be made depending on the length of time you are at work. These allowances amount to from one to two per cent. for each hour the work is continued. For example: The sixth hour out deduct from six per cent. to twelve per cent., depending on the horse, from the scale as originally constructed; these deductions are to be made by eye from the original scale. It must also be borne in mind that allowances must be made while passing over heavy roads or up steep slopes.

Counting paces or trots is very tedious work, and unless the attention is entirely devoted to it there is great danger of dropping or adding one hundred paces. Simple methods may be adopted to assist the memory and avoid this fruitful source of error. A good method is to turn up the fingers successively or shift the pencil between the fingers as each hundred is counted, or better still, by carrying a counter such as is used by base ball umpires.

3. *Time Scales.*—For this purpose a watch should be securely sewed to the left sleeve; cut a hole through the sleeve so that the dial may be seen, and provide a pocket on the inside of the sleeve. A small Waterbury watch with a second hand does very well. A

stop-watch would be better, as its record at the end of the day would give a check on the total distance traveled, and an hour scale could be constructed to read, say, twenty seconds. Starting at the even hour the reading of this scale will then always correspond to the reading of the watch.

Time scales are indispensable when sketching from the back of a railway coach or from the deck of a steamboat.

4. *Estimation of Distance.*—No other means of obtaining distance is of greater value to the military topographer where rapidity of execution is one of the primary requisites.

Instead of estimating distances in yards become so familiar with your own paces or your horse's gaits as to estimate the distances in these units. The merits that this system possess are:

1. It avoids the construction and use of a second scale, *i. e.*, a scale of yards.

2. Greater proficiency in correctly estimating the distance will be attained because you always have with you the unit of measure and can practice and test your estimated distance at your leisure, while practice in estimating distance in yards is a thing that is seldom done, because you have no ready means of testing it.

3. While working along a course if you wish to estimate the distance to some distant object, pace one hundred or more steps from a tree, stone or other object on your course, and glancing back, estimate the number of times this hundred pace unit is contained in the required distance.

The objection which might be raised to this method is that the sights of our rifle are graduated to read yards, and that on this account it is more important for a soldier to learn to estimate distance in a unit of yards, as "fire is everything, the rest is of small account." This is true, to be sure, of those that have the firing to do, but it must be borne in mind that the topographer belongs to the general's staff and has but little to do with the direction of the fire.

5. *Range Finders.*—The introduction of portable range finders greatly facilitates the work of the topographer, and in the future one will always be found in his pocket. This instrument is especially useful when operating over the enemy's ground, where his sudden presence might make it convenient for the topographer to leave the direct route he has been following and reach his objective by making a wide detour. Had he been pacing or counting his trots, he would have been hopelessly confused. With a range finder his distance would have been determined, and it would only remain to reach the point located.

It will also be found useful in locating points wholly within the enemy's lines.

The Louchier range finder seems to be best suited for this work, owing to its simplicity, portability and accuracy within the limits required of the military sketch.

6. *The Odometer* may be used for checking distances, and for this purpose is attached to the wheel of a wagon or gun carriage. It is not convenient to stop and examine it at the end of each course, and is, in consequence, not well suited to a large portion of this work. It may, however, be conveniently used when working from a cart or buggy.

7. *The Pedometer.*—A good one saves the trouble of counting your pacing.

8. *Sound, Etc.*—Distance may be determined by multiplying the interval of time in seconds between seeing the flash and hearing the sound from a distant gun by 370 yards.

The versatile topographer will also utilize mile-stones, telegraph poles, rails on a railroad, and even fence posts, for determining distances, as these are usually set at uniform distances apart.

2. *Direction and Relative Position of Objects.*

Since, in the determination of distances, the element of time necessarily precludes the use of instruments of precision; and since the accurate geodetic surveys of a country, owing to the small scales on which they are drawn, must necessarily omit many of the minor features which are of paramount importance to an army on the march or on the field of battle, maps of other kinds become necessary.

The omission of details and military features in the existing maps of a country renders it necessary, in order to carry on the minor operations of war, to construct maps purely from a military basis.

The question to be considered then is, how can this be accomplished in the shortest possible time.

The instruments now used for the determination of "direction and relative position of objects" are:

1. The plane table.
2. The prismatic compass.
3. The box compass.

Just about thirteen years ago a committee was assembled in England for the purpose of considering the question of instruments for military sketching and surveying. One of the most important

decisions arrived at by the committee was the abolition of the prismatic and box compass for military sketching, and the re-introduction of the plane table system.

The comparative advantage of the two systems, viz: plane table vs. compass, may be summed up in the following:

The simplicity of execution with the plane table is far superior to the compass, owing to the fact that you have your sketch constantly before you. Make your observations directly on the objects, and draw them in at once, as actually seen in Nature. The beginner thus becomes familiar with map reading, develops an "eye for ground," more readily grasps the subject of map making, and soon finds himself master of methods of execution that years of work with the compass would never suggest.

The single observation in the plane-table system is replaced by two operations with the compass, and if this single operation with the plane table can be made as rapidly as one of the operations with the compass, it is obvious that the former excels the latter in rapidity of use.

As to accuracy, the plane table far surpasses the compass, since in the one objects are located with a single observation directly on the object itself, while in the other the two observations necessary are subject to the following errors:

1. Liability to read wrong bearing before the needle or card has come to rest.
2. Liability to read wrong bearing when the card is stuck to the stop.
3. Liability to read wrong bearing by mistaking the figures.
4. Liability to plot wrong bearing on the sketch with the protractor.
5. Liability to adjust the protractor on the meridian lines inaccurately so that an incorrect bearing results.
6. Constant liability to take the wrong intersection of bearings when plotted on the sketch.
7. Liability of compass to read altogether wrong on account of local attraction.

This last liability to error also exists in the plane-table system, but may be overcome by orienting the board on points previously drawn in.

Colonel RICHARDS, whose experience in military sketching is widely known, epitomizes the relative value of the two systems: "For my part I may say that, of the hundreds of miles I have surveyed with the compass, I have made it a habit, after completing

the sketch, to compare them carefully with the six-inch ordnance map, and the result of it all is that I do not think I can be certain of my accuracy within fifty to seventy-five yards in a mile, while with the plane table my average error is certainly not more than half that quantity."

Colonel RICHARDS' final dictum is worthy of attention: "As to the prismatic compass it is an abominable instrument, and the complication of the system of observing directions in figures and then transferring them to paper again by figures, leads to endless mistakes between compass and protractor."

Colonels HOLDRICH, GODWIN, AUSTEN, LEECH and ARDUGH, all of the Royal Engineers, unite in condemning the compass and recommend the use of the plane-table system.

Admitting, then, that the plane-table system surpasses all others now in use, it but remains to apply its principles in a form most suited for military purposes.

All instruments for this work should possess portability, rapidity and simplicity in their use, and the greatest possible accuracy consistent with the foregoing requirements.

The following instrument seems to fulfill these conditions more perfectly than any other instrument now in use:

Description of a Military Sketching Pad.

The Pad.—A pad of good drawing paper, mounted on a heavy card-board one-eighth of an inch, or more, in thickness, the paper attached to the pad all around, and of a size suitable for the work in hand, provides the lightest, simplest and most convenient miniature plane-table conceivable, while it gives you a large quantity of paper always ready for use and in a most compact form for carrying.

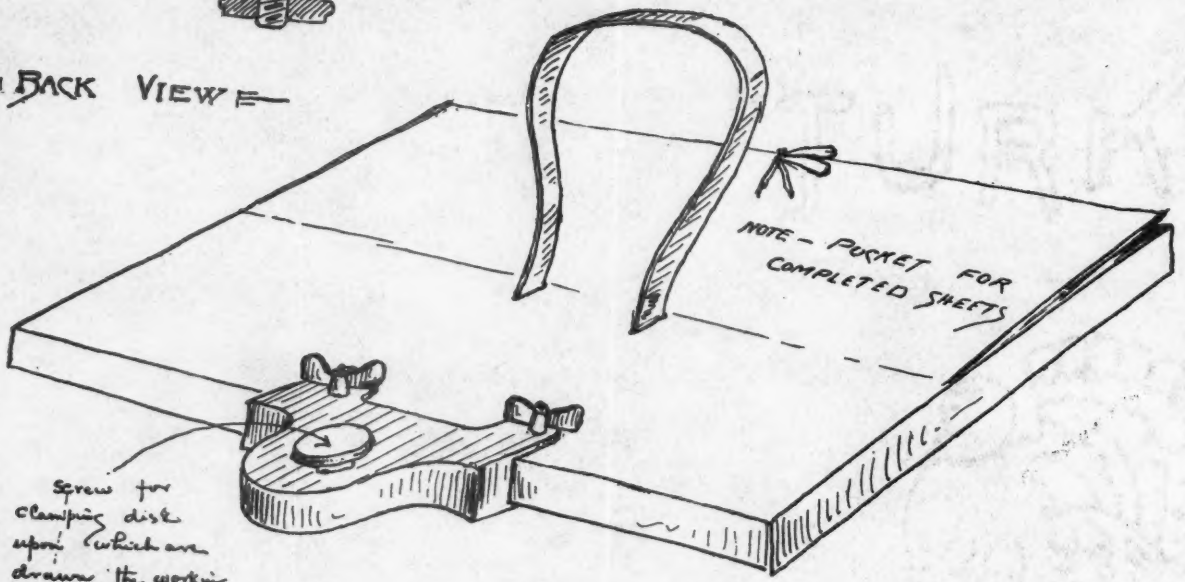
Attached to the back of the pad is a loop of leather three fourths of an inch wide. This loop slips over the left wrist and affords a simple means of carrying the pad and also of holding it while making the observation. This strap may be cut and a buckle attached, but it will be found more convenient to twist the loop by turning the pad before making each observation.

The Declinator.—Orientation in this work is best obtained by means of a compass, and for convenience the compass should be rigidly attached to the pad. The lines on the disc, in the bottom of the compass-box, give a suitable working meridian with which the needle must be brought to coincide by turning the pad.

The Alidade.—The refined alidade, with sight vanes, used with

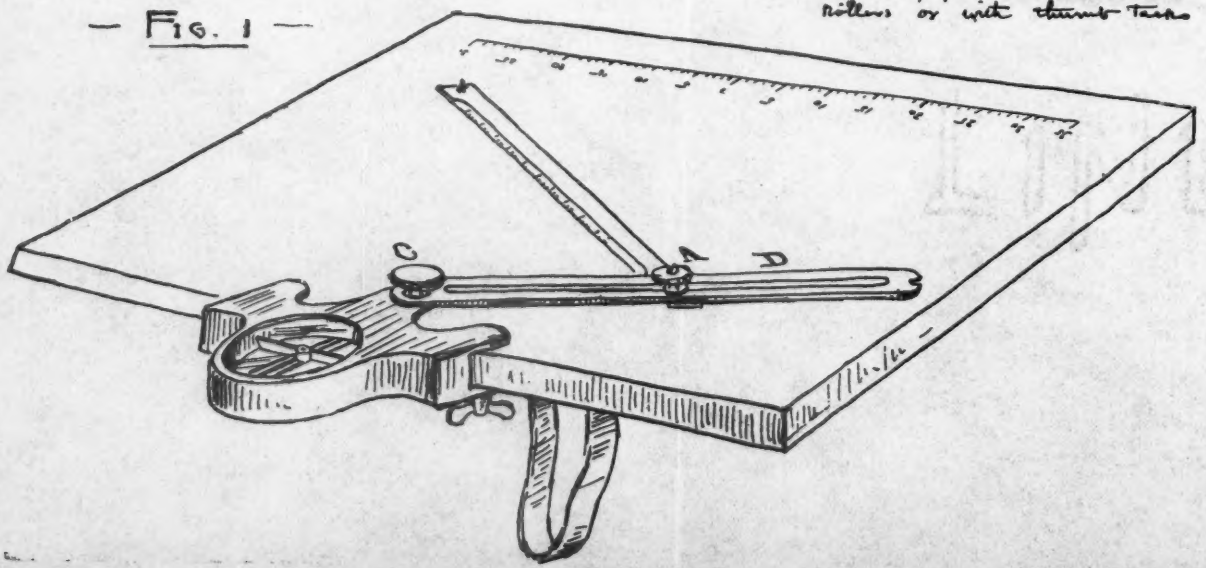
SECTION THROUGH COMPASS —

BACK VIEW



Note. It is to be observed that this device can be used on a board with the paper drawing cutter on rollers or with thumb tacks

— FIG. 1 —



the plane-table, is replaced by a simple brass ruler. This is attached to the compass head by an arm *D* (see Fig. 1). The two screws, *C* (compass screw), and *A* (alidade screw), together with the slot in the arm, enable the ruler to be *set* in any direction from any point of the pad. In making an observation the pad is first oriented and the ruler is directed on the distant object. The two screws, *C* and *A*, are then set and the line drawn in. The great advantage of thus having the alidade attached to the pad will at once be recognized by those who have spent many hours searching for their lost rulers, and who have possibly been forced to return without completing their sketch. The additional advantage of having the ruler set when the line is drawn, thus leaving the left hand entirely free for holding the pad and bridle-rein will also be recognized.

The Clinometer.—The alidade, together with the arm, are utilized for this purpose. In spite of the fact that this violates the principle of "independence of function," it seems to give very satisfactory results.

To take a slope, the ruler is clamped by means of the screw *A*, coincident with the arm. Screw *C* being loosened, the arm is free to swing about the pivot *C* when the pad is held vertically.

If the observer is at the foot or top of a slope, direct the upper edge of the pad at a point the height of the eye above the ground, the eye of the observer being placed in prolongation of the upper edge of the pad.

If a distant slope is to be taken, the upper edge of the pad should be made to coincide with the slope, the pad being held at arm's length, and the eye of the observer at right angles to the pad.

In both cases, the screw *C* is to be set before the reading is taken. The reading is taken in degrees from the graduated line near the bottom of the pad.

The Prism Attachment.

For ordinary work with the sketching pad, the ruler can be directed with sufficient accuracy when the pad is held near the lap, but for more accurate work it is necessary to sight at the distant object along the edge of the ruler. This is accomplished by holding the pad on a level with the eye and using the sights, *A* on top of the alidade screw, and *B* at the other extremity of the ruler. The pad in this case is oriented by means of the prism attachment, shown in Fig. 1.* This prism is similar to those used in the prismatic compass,

*The figures of the prism attachment have not been reproduced.

but in addition it is capable of being turned about a vertical axis, *C D* (Fig. 1). The prism holder is so arranged that it can be clamped to the compass box directly over the working meridian, in whatever position the latter may be.

To Make an Observation.—Hold the pad on a level with the eye and adjust the prism so that the needle can be seen, the prism holder having been firmly clamped to the compass box over the working meridian. Turn the pad about a vertical axis until the needle, as seen in the prism, coincides with the working meridian. Direct the ruler of the distant object and set the clamp screws. The line can now be drawn in.

These methods may seem crude to the topographer of our geodetic surveys, but it must be borne in mind that the high degree of accuracy required in their work is not essential in military sketching where accuracy must be sacrificed in order to secure the required rapidity of execution. A few experiments, however, with this instrument will show astonishingly accurate results, and it is safe to say that in the hands of a skillful operator an error of three or four per cent. will seldom be exceeded, which error is consistent with the limit of error in the determination of distance.

To the sketching pad are attached by means of strings fifteen inches long, a HHHH pencil and an eraser.

The outfit of the topographer is completed by the addition of five colored pencils, a BB pencil, a knife and a small piece of chamois skin. The whole should be put up in a neat leather case, together with an extra pad, and slung across the back.

3. *Configuration of the Ground.*

No portion of the military sketch is of greater importance from a military standpoint, than the position of ridges, hillocks, slopes and underfeatures.

"At Fredricksburg, December 13, 1862, the configuration of the ground was the all-important aid to success of the Confederates. Marye's Hill was a central salient of the Confederate position, which occupied a range of hills or bluffs extending from a sharp bend of the Rappahannock; the left of the position in a southeasterly direction and generally parallel to this river for a distance of little more than seven miles. Between the bluffs and the river, an average distance of 2,000 yards, was a natural glacis, intersected near the left by a canal, centrally by two runs or narrow water courses,

with a few scattered gullies, and opposite Marye's Hill by the town of Fredricksburg on the river bank.

"Marye's Hill was regarded as the key to the position; and possessing at its foot a road, enclosed on its outer edge by a shoulder-high embanked stone wall, behind which were about 2,500 infantry reinforced when depleted, and with its front swept by direct and cross artillery fire, it proved impregnable to repeated assaults; and it can be safely said that its strength was such that a force, double that which attempted it by frontal attack, could not have gained it in this manner. The influence and effect of such a powerful aid to the defense on the operations of the Union army were so positive as to render nugatory all attempts made during the battle to defeat the Confederate army."

The configuration of the ground must be shown on the sketch by contours, as this is the only method by which the topographer can give precise expression to his information and impressions concerning heights, slopes and underfeatures.

Hachuring has been used for this purpose, but it may be now classed among the things of the past. A sketch executed in hachures would possibly be more pleasing to the eye, but it cannot be made so mathematically invariable in its conveyance of ideas as the contoured sketch. A steep gradient to one topographer might stand for a moderate declivity to another, according to their peculiarities of judgment, or to the different schools of drawing in which they have been educated. Not so with the contoured sketch, where a glance at the contours and at the scale of horizontal equivalents at once gives the slopes and form of the ground.

A method of giving body and expression to the contoured sketch, and thus making it fulfill all the advantages of the hachured map, and placing it within the grasp of the popular eye is described under "Finishing the Sketch."

Contouring, to say the least, is a difficult process, and requires much patience and skill in the operator. Ability in this direction is, however, one of the prime requisites of a good topographer, but skill can be acquired only by long and careful practice.

Study of the various methods outlined in text-books will be of great assistance, but practice alone will result in success.

It is a wise precaution in contouring to confine one's self to the local plot, and care should be taken not to be too comprehensive, and go beyond the bounds of certainty into the outer limits of conjecture.

The clinometer is the only instrument used for sketching con-

tours in military work; with it the slopes are taken by one of the methods previously suggested. The operator then consults his scale of horizontal equivalents, which gives him the distance apart of his contours.

With this unit alone, after having first oriented his pad, the topographer must sketch in his contours, resorting to such collateral methods as his ingenity may suggest.

Finishing the Sketch.

Although artistic beauty is not an attribute that is essential in a sketch, it is, nevertheless, decried and dubbed "eye-wash" only by those who have not themselves ability in this direction. That the sketch is artistic, certainly does not detract from the accuracy of the work, while, on the other hand, the appearance is not only more pleasing, but the sketch can be more readily interpreted — particularly by those not thoroughly familiar with the simple plan. Neatness is the principal requisite, and extreme care should be taken to make all of the conventional signs clear and distinct.

The following order should be carried out in the execution of this portion of the work, and this should be done after each day's field work:

1. Unite the sheets.
2. Give body and expression to the contours by application of powdered lead.
3. Complete all details with colored pencils.
4. Letter the sketch.
5. Complete the report.

1. *Unite the Sheets.*— All sketches should be begun about one-half an inch from the bottom of the pad, and the work should be carried up the pad until it runs off the top or side. Upon the completion of the work the sheets are now united with mucilage, each sheet overlapping the succeeding one enough to make the work continuous. Care should be taken to unite the sheets, so that the edges will be exactly parallel. The entire sketch is then made rectangular, filling in the spaces and corners with extra blank sheets taken from the pad.

The above method will give a neat map, which can be more conveniently and rapidly prepared than by the method of using a single continuous sheet secured on rollers.

2. *Give Body and Expression to the Contours.*—Unless the contours are so close together as to produce striking contrasts of light and

shade as the slope varies, the sketch conveys no meaning to the unskilled eye. The ordinary observer sees in it only a maze and confusion of lines, of whose design and import he is ignorant. In order, then, to bring the sketch within the grasp of the unskilled eye it is necessary to resort to some system of shading which gives body and expression to the contours.

Powdered lead, applied with a piece of chamois skin, seems to be the most rapid and best means of producing the desired results.

Method of Applying.—Before applying the lead go over with a pencil those portions of the work where there is danger of obliteration by continued rubbing with the chamois skin.

Scrape some lead from a soft pencil (*B* or *BB*) on a clean sheet of paper. Fold a piece of chamois skin five or six inches square so as to obtain a point to work with. Rub the point of the chamois skin well into the powdered lead until it is coated with a good supply of the powder.

Apply the lead to the sketch with the point of the chamois skin, beginning at those places where the contours are closest together, and making the strokes in the direction of the contours, rubbing the lead well into the paper. Fold a clean point of the chamois skin, and graduate the shade from these darkest portions to accord with approach or divergence of the contours. Continue to work up the shade, bearing in mind that the space between the contours which are nearest together should be darkest, while the other portions are lighter in direct proportion to the distance apart of the contours.

Having acquired proficiency in this method, a much better effect of relief is obtained by considering a source of light, usually from the upper left-hand corner of the sketch, and shading the slopes away from the source of light much darker than those toward it. As this method is liable to lead to exaggeration for sake of effect, it must be handled with care.

The eraser may be used freely for cleaning up the ridges and hill tops. When used the strokes should be made parallel to the contours.

3. *Complete the Details With Colored Pencils.—Conventional signs:* "A knowledge of conventional signs used in drawing and which are almost exclusively used by military draughtsmen is very important, and putting them in clearly and in their relative position is almost more necessary than great truth of measurement." Thus in a road reconnaissance the omission of good watering places, good pastures,

camping ground, hay stacks, etc., is a more grievous error than an error of five or six per cent. in the distance.

All conventional signs used in military sketching should be capable of rapid delineation and unmistakable interpretation. They should convey as nearly as possible an accurate impression of the object they represent.

Formerly this work was executed in black and white, but the skillful use of colored pencils seems to be productive of better results, giving a sketch more readily interpreted and less liable to confusion.

It is to be regretted that no colored pencils have been made of sufficient hardness to admit of their receiving a fine point. However, a little experience and care in the use of such as we have will give very satisfactory results.

The number of pencils carried should be reduced to a minimum. Red, blue, brown, yellow and green are necessary.

Red for stone in any artificial form; also for brick.

Blue for water and for *metal.*

Brown and *yellow* for earth and rocks in situ; also for wood in any artificial form.

Green, all foliage, trees, grass, etc.

All conventional signs should be made free hand and executed with as much care as the time will permit.

4. *Landscape Sketching and Photography.*

Landscape sketching is a most important adjunct to the military map. Small pictures assist in the interpretation of the configuration, as shown by the contours, and in addition may contain many important details not shown on the sketch. The picture presents to the eye the impression that the ground itself would present to the observer, and a general might make many of his dispositions directly from the landscape sketch.

That well-known writer, DE BRACK, in reply to the question: "Should a light cavalry officer, then, learn to sketch in order to observe well, and take a course in topography?" states, "It is indispensable, if he wishes to become a distinguished officer. I believe that this course should embrace some knowledge of colored ærial perspective."

An outline drawing, showing the profile of hills, can be made doubly valuable if the slopes and command are given. Now, all that is desired of a slope, is to know whether it is practicable or

impracticable for the various arms of the service. It is of no importance to know that one slope is two-and-one-half degrees, another six-and-one-fourth degrees, but what must be known is, whether infantry, cavalry or artillery can maneuver and discharge their various functions on that slope. All practicable slopes can be pointed out by drawing on them the conventional signs of the arms which can operate over them, marking the visible slopes with the plus sign, the reverse slopes, minus.

The landscape sketch comes to the front and affords a means of conveying information in one case, where all other methods fail—and that is in the reconnaissance of ground in the possession of the enemy.

As economy of time is one of the primary requisites in military sketching, the topographer should make simple profile sketches, putting in such detail as is useful for military purposes. This caution is particularly applicable to those of artistic ability, who might be tempted to linger over their sketches, endeavoring to produce artistic effects, thus losing time and producing results of little military value.

Small "sketches of location," as sketch of a gate, a house, a peculiar rock, hill, etc., are invaluable adjuncts to the map, particularly at the junction of roads where there may be some doubt as to which is the correct route. The value of these small "sketches of location" is well illustrated in the following: "We were presumably on a part of the river descended by Lieutenant ALLEN in 1886 with a crew of natives, but thus far had been unable to make the country fit his map, and were in doubt until we reached the lower end of the cañon" (an expedition through the Yukon-Hayes). Had a few "sketches of location" been added to the map, no such difficulty would have been encountered.

Photography.

Photography affords a mechanical means of obtaining the picture, and the great strides in this art will soon place a camera in the field well adapted to military work. When the methods of developing and printing are simplified the camera will doubtless constitute a portion of the outfit of every military topographer.

Portability, simplicity, and sufficient strength to withstand the rough usage of field service are the requisites essential in a military camera.

The advantages that the photograph possesses are:

1. A large number can easily acquire the art while only those of native ability can make the landscape sketch.

2. The time spent in the field is much less than in the landscape work; the former requiring but a few seconds, while the latter necessitates a considerable halt.

3. The photograph surpasses the landscape drawing in accuracy and amount of detail.

"For development it is necessary to have a concentrated developer, one that can be used several times over, and one that will develop prints. Very few dishes must be taken; two would be sufficient, one for developing and one for fixing. As regards paper for rapid work, bromide paper has two great advantages. It can be used while the negative is still wet, when thus used requiring no printing frame; and the light used is artificial, enabling printing to be carried on at night. The prints would be developed and fixed with the same chemicals that are used for the negatives, the only extra chemical required being acetic acid for cleaning; glacial acetic acid should be carried, as this is very concentrated. Bromide paper requires no toning.

CONVERSATIONS ON CAVALRY; BY PRINCE KRAFT ZU HOHENLOHE-INGELFINGEN.

TRANSLATED FROM THE GERMAN,
BY FIRST LIEUTENANT CARL REICHMANN, NINTH INFANTRY, U. S. ARMY.

SIXTH CONVERSATION, (JANUARY 24, 1886).—RECONSTRUCTION OF THE CAVALRY AFTER 1815. RIDING INSTRUCTIONS AND RIDING INSPECTIONS.

H. To-day we will take for our subject everything that was done after the War of 1815 toward the restoration of the Prussian cavalry after its decline.

S. Rather call it "creation" than "restoration," for you rightly stated the last time that the Prussian cavalry was as good as wiped out. There was, it is true, a body of troops styled "cavalry," but, with few exceptions, no horses equal to the requirements of campaign horses, nor horsemen capable of training them—the thread of tradition had become sundered.

H. It seems queer that the authorities quoted by KAEHLER, as BLÜCHER, BORSTELL, ZIETHEN, THIELEMANN, failed entirely, or almost entirely, to mention this most important circumstance—that there were no foundations on which to erect the structure of what we call good cavalry.

S. It can be explained only by stating that these gentlemen had passed through many years of political and military turmoil, during which they paid more attention to the use of cavalry in masses than to instruction of the individual; therefore they speak more of the leading, of the unification of the cavalry under one head, of the number of successive lines with which cavalry is to charge, and if any one of them goes into details he does not go beyond touching upon the loose charges and the small number of combatants in a squadron or regiment, and calls for more and larger squadrons; but hardly one of them mentions the fact that the riders could not ride, and the horses were worthless.

H. MARWITZ is the only one to assert that the cause of the evil was lack of proficiency in riding, as I stated the last time.

S. MARWITZ, we found the last time, was not one of those called upon for an expression of opinion by BLÜCHER, for his paper was written before BLÜCHER'S request.

H. His paper nevertheless seems to have attracted attention, for in the appendices he speaks of objections raised against it.

S. These very exceptions prove that he met with a rebuff, and it seems, not from the press, but from his superiors, for his essays were not printed until about the middle of the century.

H. May be; yet his Cassandra warnings attracted attention immediately after the Wars of Liberation, but I am unable to state whether they were his own or of others like him, now unknown to us.

S. What makes you think so?

H. Because the first steps taken by King FREDERICK WILLIAM III. aimed, in the first place, toward laying anew the foundations of the cavalry service. They are four in number: 1st, The improvement of horse raising in the country; 2d, Preparation of riding instructions; 3d, Issue of cavalry drill regulations; 4th, The formamation of the squadron of instruction (Lehr-Eskadron), our present riding school.

S. The improvement, or better, new creation of horse breeding in the country was one of the wisest steps, and could not help improving, and did essentially improve the breed. But its complete effect could make itself felt only after a long time. It needs no proof that several decades, nay, nearly half a century, must pass before the home-bred horses could furnish the annual supply of good remounts. To-day the German army requires an average of 10,000 remounts per annum. Nor could the squadron of instruction produce at once the great number of instructors required.

H. For a time they had to put up partly with an inferior domestic breed of horses, partly with purchases abroad (Poland and Ukraine) and a small number of instructors. Of more immediate effect were the riding instructions and drill regulations. I have always heard and believed that the riding instructions came out in 1816, SOHR being the author. Now I read in the "New Cavalry Sermons," to which you called my attention, that they were not issued until 1825.

S. SOHR is the author. I too believed them to have come into existence immediately after the War of 1815. Whether or not the statement of the "New Cavalry Sermons" is authentic, I do not know. May be that the riding instructions at first simply existed as

a work by VON SOHR and were not officially adopted until later. At any rate in the course of years they have not produced what it was intended they should and would.

H. Your statement surprises me. Did they not remain gospel for our cavalry during fifty years, even for our best and most prominent riders? When, finally, new instructions were to be prepared, did we not hesitate for a quarter of a century?

S. I do not and cannot have any desire to detract from SOHR'S merits, and I acknowledge the many good points of the old riding instructions. Nor were their defects the cause why the work was not correctly done; the fault was in their application and interpretation.

H. In what particular?

S. Everything was treated from the infantryman's point of view, and instead of riding onward in harmony with the spirit of the riding instructions, they clung to the letter and rigidly adhered to the forms of them. As instructors and commanders advanced in age they were unwilling to vary from the regular routine, and the troops had to conform to their ideas.

H. Then WRANGEL made his appearance in 1843 with his cavalry exercises, and brushed aside every one who could not come up to his standard.

S. After that there was a clamor for a revision of the riding instructions. That the riding was not fine and proper was not the fault of the old riding instructions, for their elasticity made good riding practicable. For that reason it was long before the new ones were finished, as it was difficult to improve on the old ones. It was about 1860 when the War Department decided to issue new riding instructions, but the difficulties in the way of producing something better proved so great that 1882 arrived before the three parts of the new riding instructions were issued.

H. That is my recollection also. I became regimental commander in 1864. The old riding instructions had become so scarce that the number of existing copies was insufficient for the instructors. I applied for more copies. My request was denied because the old edition was out of print, and a new one could not be printed since new instructions were to be published. It was only when it became clear that the new riding instructions could not be completed, that the first part of the old riding instructions was reprinted in 1866 and could be bought. The difficulties in the way of producing something better prove the good quality of the old instructions.

S. Certainly! The riding instructions were based upon the principles of the art of riding and formed an excellent help for instructors,

themselves good riders. But they were not properly applied. Later provisions impaired the elasticity of the instructions, their adaptability to different breeds of horses and kinds of riders. They contained some provisions which gave rise to incorrect interpretation in the hands of an instructor not imbued with the true rider spirit.

H. Please explain in detail.

S. In the first place, the rigid division of the course of instruction into periods was unfavorable to the further development of the cavalry.

H. This division is indispensable in view of the universal liability to military service and the limitation of service with the colors to three years. In the days of standing armies, recruited by voluntary enlistments, recruits might be trained as slowly or as quickly as was best suited to each individual. The same thing was feasible with the remounts which were bought as required at all seasons of the year and trained each by itself. Now, however, a time must be fixed for placing recruits and remounts in the ranks in order to secure the strength prescribed for troops turning out for the great exercises after harvest.

S. This will generally be found necessary, but it would be sufficient to prescribe that the recruits must be ready for the ranks by spring and the old remounts by summer.

H. Should it be left to the discretion of every instructor to train recruits and remounts as he pleases?

S. Bless you, no! The course as laid down in the riding instructions is most excellent, and based upon correct principles. But the evil consists in the rigid division into periods for riding on the blanket, curb bridle, saddle, etc. Some recruits are more apt than others and may be put on the saddle earlier; some remounts must be worked longer on the snaffle than others—must be broken to gallop, etc., later. In matters of adroitness of body, recruits and remounts are individuals, to be treated each according to his natural aptitude. It is, therefore, injudicious to put all recruits on the saddle on a fixed day; all remounts on the curb, after the riding inspections on blanket or snaffle, respectively, are over.

H. I should think that a prudent troop commander, after the riding inspection on the blanket, would continue backward recruits on the blanket, and work remounts whose natural conformation requires it, on the snaffle longer than others.

S. This rigid division into periods in turn makes the subsequent period too short. You said yourself, in your letters on cavalry, that the method of inspection influences the method of training, in

which I concur with you. Accordingly, after the snaffle inspection, the remount is considered "finished on the snaffle," and cases can hardly fail to occur of horses being put to the curb irrationally and forced into a period of training for which they are not ripe, to the detriment of their training and their sinews. I mention only the change from the snaffle to the curb, but the same holds good for every other part of the training.

H. It was left to the discretion of the inspector to direct the instructor to continue this or that remount or recruit for some time yet in a lower part of the course.

S. True! but you must not forget that the large number of experienced instructors and inspectors did not exist, at least in most of the regiments. The thread of tradition had been sundered, the troop commanders were still very young in years, and though many of them were firm riders, none had learned how to impart instruction; hence the inspection was made, and after the inspection everything was advanced to the next higher course.

H. But I should think the inspection at the end of each period was indispensable.

S. Why?

H. Because, as you just stated yourself, the thread of tradition was cut, and the instructors themselves had not yet learned how to instruct. Besides, after 1815, the necessity for controlling the instructors had become apparent. Old veterans of those days have told me that after 1815 the troop officers considered it their duty only to lead their platoons in drill and battle, and that individual instruction was none of their care. From the time preceding these great war-like events they had heard it said that the interior service of the squadron was the business of the troop commander, first sergeant and quartermaster; the training of recruits and remounts that of the non-commissioned officers—that it was unbecoming their dignity, as it were, to attend to such matters.

S. Did the fidelity to duty, so well established in the army, fail when the functions of the officers were prescribed from above?

H. Fidelity to duty alone cannot overcome deep-rooted prejudices; it requires time. Long continued war also produces stubbornness of character among the officers themselves. Just consider that they had gone through four years of war, preceded by six eventful years, two of which were also years of war.

S. It is true that long-continued war does not promote discipline in all grades of the army, however much else a short, brisk,

lively war may tend to eliminate prejudices, and remove the rust which a long peace has deposited on the edge of the sword.

H. This went so far, I understand, that in a corps of officers a storm of indignation broke forth when it was ordered that the officers should supervise their own squads once in a while. They considered the order an insult to their profession, believing that something was required of them which was the proper function of the non-commissioned officers. Thus it became necessary to introduce the inspection as a means of ascertaining whether or not the orders given were being carried out.

S. The inspection and control were indispensable, it is true, and still remain so, for there are, and always will be, individuals with a leaning to indolence, who, flagging in zeal, infect others with their indolence unless they are spurred on and corrected; but the control can be exercised by the frequent presence of the troop commander, and over him by that of his superiors. The inspection must also take place, as an opportunity for proffering advice and instruction, in order that the young may learn from the old and experienced instructor how to impart instruction. In order to make it a success, to make timely corrections of wrong methods, it is better not to inspect on the days fixed as the end of each course of training, but to do so during the course.

H. Do you wholly deny the value of the inspection at the end of each course, as a receipt for so much energy expended and work done, as a means of rousing ambition and emulation between the several instructors? The officer who has stood all winter in the cold riding hall, who, with zeal and affection for every single remount, has directed its development, who with infinite patience has guided each individual remount rider by advice and example, likes to hear once a year at least, that he has done his duty well. Should he, however, hear no more of his efforts than the one who has troubled himself little about his squad, he will have no desire to go to the same trouble the next year. For the zealous officer this day is a need; he does not like to miss it. He anticipates with joy the day on which he can show what his squad can do.

S. You see the evil consists in this very thing of "showing on the day of inspection what he can do." During the entire course of training the work is done with a view to this great inspection day. Not only is all that is in them taken out of the horses on this day, but they are previously trained, mistrained, "kniebelt" for the sole purpose of making a good showing on this inspection day. There, on the snaffle inspection, some one puts the remounts through

the "renvers" at a slow trot. If the superior say but one word in approval, some one else next year is going to work up volts and turn-abouts on two hoof-beats. During the entire course of training he has it on his mind, that he wants to show that on the last of January. He orders it and the horses are more trained dog-fashion than broken as horses, the figures laid down in the riding instruction are gone through, but how? Flinging without properly carrying, without bringing the hind hand well under. The consequences are, horses not in hand, broken down sinews, torn mouths, obstinacy here, there and everywhere. The instructor does not care, if he has only "wound up" well; for his usefulness as a cavalry officer is measured by this day.

H. You mention figures and paces which the riding instructions forbid to be used in closed squads.

S. It is only the new instructions that do so. The old ones do not prohibit it. Yet in spite of this prohibition we still have to combat a disposition toward such untimely tricks. And it is difficult; for this sin is committed by our best and most zealous riders. It has its roots in the existence of this inspection day at the end of the course. It is utter nonsense to prescribe that a remount should by—say the 31st of January—have made a certain progress. A horse can be only so far advanced each day as is possible according to the nature and during the physical development of the horse under rational treatment.

H. BAUCHER says: "Plus vous allez lent, plus vous irez vite."

S. A very sensible principle which neither rider nor riding instructor can follow, if on October 1st he has it on his mind that by January 31st he must have progressed so and so far. He is bound to precipitate matters to the detriment of the horse's later efficiency. Control, inspection, praise and censure, the stimulus of emulation, ambition and interest are necessary. The squadron formed as a whole must, after the completion of the training, have an opportunity on the inspection days to show what it can do. Only during the course of training there should be no inspections at the end of every separate part of the course. It is only when the troop commander is frequently present at the instruction and assists with his advice, when the regimental commander makes his inspections during the several parts of the course of training without previous warning, and suddenly, so as to witness the instruction of the different classes from beginning to end that he can better judge of the course of training, improve and control, than by inspections at the end of each part of the riding course, and by praise and censure rouse an equal amount of

ambition and emulation. He will thereby produce a rational course of training rather than artificial productions. This does not preclude that the periods of instruction as laid down in the riding instructions be generally, with some elasticity however, adhered to.

H. What you are saying there is convincing and correct in itself, still I believe that no blame can attach to the time immediately following the period of war, and the methods then instituted for not following the way indicated by you now; for we must not forget that there were but few troop commanders who could teach the riding instructors how to impart instruction. In the artillery I know there were to be found battery commanders twenty-two and twenty-four years old; in the cavalry the troop commanders were also very young and they had certainly never been riding instructors before. The regimental commanders in the preceding stormy time had become leaders in battle rather than moulders of cavalry. A system was sadly wanting, especially since the introduction of the three years service; there was nothing left but, with the riding instructions and orders in hand, to instruct and carry out to the letter everything printed therein.

S. I do not wish to blame any one. I merely wish to state that, and where wrong ways were followed; I do not deny that there were no better ways then. Now if the majority was compelled to become riding instructors with the book in hand and from the book, it is not to be wondered at that the majority went astray; for in that we agree that from a book alone one cannot learn how to ride. The language is insufficient to express everything the rider ought to feel.

H. You are right there; I have frequently heard hot arguments between experienced riders; finally it turned out that both meant the same thing and that the only difference was in the mode of expression.

S. Therefore, it is necessary that the theory, doctrine, study, always go hand in hand with practice properly supervised, with doctrine living in the practice, with living example.

H. In no arm were more drastic living examples to be found than in the artillery, where good riding instructors were of course much scarcer than in the cavalry; there were many officers, reputed good riders, who had taught themselves from books. I remember one who, when thrown from his horse, walked home to look up in SEIDLER what he ought to do in that special case.

S. That is an extreme and indicates the direction one may take in the absence of riding instructors who propagate the art by living

tradition. You must not, therefore, consider it a stricture upon the riding instructions if I point out one more error into which one is apt to be led by following them to the letter.

H. What is it?

S. The old riding instructions divide the riders into three classes and direct that each class be trained according to the corresponding part of the riding instructions. The first class comprises the riders generally; the second class is to furnish the riding instructors and remount riders; that the third class, to be composed of the most perfect riders, can be trained only at the "squadron of instruction," the old riding instructions do not expressly state, but mean to.

H. Have you any essential exceptions to take to this division into three classes?

S. Not to the division, but to its rigid combination with the text of the three parts; in the second part of the riding instructions the breaking and training of horses only is spoken of; there is no limitation whatever to what the second riding class is to practice.

H. Well! if the remount riders are to be selected from the second class, all riders of the second class must learn those exercises which are needed in the training of remounts?

S. That is just the great error into which they fell, which is still shared by the greater part of our cavalry, and which you are sharing, too. Why should a rider, who later on is to break horses, practice on a trained horse things which he has to teach an unbroken horse later on? He will be unable to judge of the sense and purpose of such exercises if he practice them on a broken horse, upon which they produce an effect quite different from that on an unbroken horse.

H. For the broken horse it forms a kind of repetition, anyway.

S. Why a repetition, when there is no need for it? I asked you once before if an author rehearses the rules of grammar? Why should the instructor of the first class, who is selected from the riders of the second class, and found to lack aptitude for remount riding, learn exercises exclusively calculated for the breaking of horses?

H. In order to be able to make a broken horse still more pliant, supple and obedient.

S. Now, that is just the general wrong idea! The man has no aptitude for horse breaking, and is expected to make a broken horse more pliant, supple and obedient. What is he going to do? Lacking understanding for the nature and way of reasoning of the horse, he will "kniebel," mistrain, maltreat it; he will impair its pace and carriage, *i. e.*, its efficiency; he will ride the paces prescribed in the

second part of the riding instructions, but how? He will be bungling, not riding. Add to this, that the work is done with a view to the inspection. The troop commander seeks to have the second class as strong as possible; he strives, if possible, to show all riders in their third year as fit for the second class. Unusually awkward men only, troop tradesmen, and officers' strikers, perhaps, remain in the first class; all the others ride the most beautiful figures at the inspection—Renvers, Travers, Schulterherein and Crossing. If one squadron has so and so many riders of the second class, the other is asked with surprise to explain why it could not train an equal number of second class men. What is the result? The squadron commander proposes to himself, "so and so many men I must present in the second class." If he does not succeed in getting that number, he takes individuals that can never ride in that class at all, only to make up the number.

H. I like the expedient resorted to by many squadrons, of forming a middle class, from which here and there, during the course of instruction, men were transferred to the second class; the class thus formed they called "first class trained for second."

S. I read that in your letters on cavalry, and must confess was alarmed to hear you advocate it.

H. I submit to the greater experience of the specialist, but must ask you for your reasons, in detail, for this opinion.

S. You will concede that only a good normal seat enables the rider to give the aids laid down in the second part of the riding instructions for the training of horses.

H. All authorities are agreed on that; the latest work, "New Cavalry Sermons," also points it out.

S. Like every other book on cavalry! Yes, the seat! not only the prescribed seat, as produced by verbal instruction at a halt, but that firm seat which has become second nature, which closely, yet gently, fits the horse's body, which is not disturbed by any of the horse's motions, and which permits the rider the free use of those limbs with which he has to give the aids, without change of position. From the hip to the knee the position of the body must invariably be the one prescribed, whether the rider bring the lower part of one thigh forward, the other back; whether the rider turn or bend the upper part of his body, whether he use his arms at pleasure. This is of great importance in the training of horses, in order that the center of gravity of the rider shall always come to bear where it should. How long do you think it takes a rider to acquire that firmness of seat?

H. Certainly a long time.

S. I tell you there are many human structures which can never attain to firmness of seat sufficiently to be able to give to a remount the proper aids under all circumstances.

H. Men of such unfavorable conformation of body should not be put into the cavalry.

S. In that case we would be unable to train the required number of horsemen. With very few exceptions, they can all acquire such firmness of seat as will enable them to use their arms on a trained horse, to become "cavalrymen," but to such a soft, natural, and yet firm seat, as is required for horse breaking, not all men are suited; and those suited again require long continued and constantly watched practice, unless like the boys at the breeding establishments, they are born on horseback as it were. If a man whose seat has not yet become firm, is to apply the aids laid down in the second part of the riding instructions, he will change his seat every time he gives an aid, either by thigh or rein. Thus by changing the center of gravity he unconsciously gives an involuntary aid. He hangs on to the reins. The obedient animal obeys this aid, and makes a motion which the rider, unaware of his own awkwardness, considers as refractory. The conflict begins and ends with "kniebeln," the horse becoming spoiled, restive, mistrained, etc. I cannot describe this better than the "New Cavalry Sermons" do.

H. How much time, according to your experience, is required for a rider of suitable conformation of body, to acquire such firmness of seat as will enable him to correctly use the aids laid down in the second part of the ride instructions?

S. Leaving out those "born on horseback" as it were, men of suitable conformation of body, under rational instruction and continuous riding on trained horses, by calisthenic exercises, riding in the terrain, use of arms, and everything pertaining to campaign riding, become in two years so proficient and firm in their seats that they can understand and use the aids given in the second part of the riding instructions, without detriment to the remounts; but understand, only under the constant guidance and supervision of skilled and experienced instructors.

H. Then you would take only men in their last year of service into the second riding class?

S. With the exception of some specially gifted riders, or those "born on horseback," yes; and not all of them, but only those specially suited. From among the four years' volunteers and those serving for promotion to non-commissioned officers, a selection would

also have to be made, for one may be quite a good cavalryman and rider on well-broken horses, even instructor in the first riding class, without ever being capable of becoming a remount rider, a rough rider.

H. Do you not there come in conflict with the riding instructions, which prescribe the first part for the first; the second part for the second, and the third for the third riding class?

S. In the old riding instructions there is nothing of the kind. On the contrary, they say specifically that the first part of the instructions applies to all cavalrymen liable to three years of service, and that they form the first riding class. Into the second class non-commissioned officers and such privates were to be transferred as possessed special aptitude. It is true the old riding instructions direct neither that all riders of the second class should ride everything contained in the second part on old horses, for this part treats of the training of the remounts, not of old horses; nor do they prescribe that the number in the second class should be as large as it was in fact.

H. The new riding instructions are very explicit.

S. Of the new riding instructions we will speak later. As to the use of the old ones, you will admit that it was nonsense and inconsistent to form a large second riding class, and make it ride on old horses all those exercises which are prescribed for the training of remounts. The old horses are already trained; hence the rider is only taught aids and effects of aids, which are not suited to remounts, and are therefore wrong.

H. If you do not let any of the riders in their second year of service, and belonging to the second riding class, ride all those exercises on old horses which they need in riding remounts, you cannot firmly train riders in their second year of service so as to make them remount riders in the third year.

S. But why should I? When, after a two years' course of riding the gifted riders have been selected, they are put on the remounts and taught the aids on them.

H. Thus you fail to train any rider among the men who can break remounts by himself.

S. With a term of service of three years, this is altogether out of the question, for, properly speaking, a rider can never cease to learn, though he ride for fifty years. We can only expect of some few non-commissioned officers of long service that they become independent rough riders. The pillars of cavalry to-day can be only those officers who see in this art a part of their life vocation.

H. Is not the art of riding thus lost in the grades of non-commissioned officers and privates?

S. No! on the contrary. The foundation of the art of riding —the seat—is confirmed only by adhering to this principle. It is only the finer, higher degree of the art which all those must forego who do not cultivate it long enough to become capable of acquiring it.

H. We are straying from our subject of to-day, the development of the cavalry after the War of 1815.

S. Thus ardor carries us away into the details of the art. Another consequence of the subsequent erroneous ideas was the spreading desire, opposed to the spirit of cavalry, of reducing everything to a scheme.

H. I became aware of it myself at the beginning of my service without perceiving, however, that it had anything to do with the development of the principles and the errors referred to by you.

S. What I told you with reference to "working for the riding inspections" led, in the absence of regulations prescribing much and continuous individual riding, to the following results: In all riding classes an effort was made to have at the ends of the several riding courses, the classes with distances of two horses' lengths perform some quite pretty and artificial productions selected from the second part of the riding instructions. There were some recruit classes that rode side paces and received official praise for it. But nowhere were these performances the result of a thorough training according to the rules of the art of riding, but more or less the result of a training similar to that of trained dogs. Without proper carriage when in motion, without carrying themselves evenly the horses did what was required of them. They did not step the side paces, but fell sideward. In spite of faulty aids they went the prescribed figures but under constraint and pain. This constraint and pain they could stand only the three-fourths of an hour prescribed for hall riding. As soon as they were freed from the yoke and left the hall, nature asserted herself. She opposed the constraint. She freed herself from it. Therefore the horses lost their carriage as soon as they left the hall; or rather it then became manifest that it had been erroneous to think that they had the carriage. It became plain that they had never even acquired the carriage, the balance.

H. You are right. When hall riding was over the horses were at first unmanageable in the open.

S. Some held back and became restive; others to rid themselves of the pain, bolted; nearly all lost the extended pace, if they ever possessed it. Hence the rider had to be given time to quiet his

horse. He allowed his horse relaxation from the supposed "carriage," and then the good-natured animal submitted to the drill forms, more from habit, however, than obedience to the rider.

H. Yet the drill was eventually carried on with correctness.

S. Yes, on the level drill ground, not on the terrain. And how many horses stuck, how many ran away in the charge! I must again remind you of the time when there were but few horses in each squadron that could be used for patrol duty. The lack of proper carriage on the part of the horse became especially apparent whenever during the drill season an attempt was made to have the classes ride in the hall as they had done during the winter.

H. That I should think would have exposed the error.

S. It did not, for subordination compelled adherence to the riding instructions and orders on the subject. On the contrary, ideas spread that drill, the maneuver, the use of the horse generally, was detrimental to riding, as ruining the horse's carriage. A disposition to see in hall riding the highest aim of cavalry, gained more and more ground. Far less value was attached to efficiency on the terrain, in drill and maneuver than to hall riding, which was considered the art of riding. Instead of the means to an end, it became the end itself.

H. I remember very well how our highest superiors used to assemble for snaffle inspection, and "stuck it out" with creditable perseverance.

S. They knew that snaffle work was the most important. But this snaffle inspection was an evil. Another evil consequence was this: At the beginning of the drill the troop commander was apprehensive lest the horses should lose their carriage. There was no beginning with lively gaits; the jog trot was used for a long time, to the prejudice of lively paces, to the detriment of the front legs, to the *ennui* of the riders. As a charge would completely disorder the troop, it was carefully avoided. The drill was conducted with more and more uneasiness and diffidence, and when a squadron once had to pass a ditch, it was no small undertaking.

H. Many such things I saw myself. I remember that a regiment on the drill ground trotting up in column of squadrons (right in front) had to come down to a walk in order to change direction to the left because the wheel at a trot might have thrown it into disorder; and this happened at the inspection at the end of the drill season. Forty years ago many a regiment received well merited censure for its inability to take a ditch in the maneuvers.

S. Can the school of such a regiment produce a SEIDLITZ? But

listen: The more the use of cavalry was considered an evil, tending to alienate cavalry from its supposed object—hall riding—the more was the attention of all superiors directed to hall riding, as the one essential thing. The higher the superior interested in this direction, the more he demanded uniformity from all the regiments under his command. It brought out orders as to formalities to be observed in hall riding and at the inspection, and wholly foreign to the subject—such orders as those mentioned in your letters, for instance, that in order not to prove a failure, line must be formed after inspection the same as before inspection.

H. I might tell you some worse things, and mention organizations where the commands were written on a separate sheet in the rotation in which they were to be given—a sheet which we youngsters used to call "the *menu*." Woe to the instructor who commanded an "about" earlier than laid down in the *menu!*

S. Little attention must have been paid to the execution.

H. Hardly any attention was paid to the manner of execution, the carriage of the horses.

S. Thus arose a pedantry, disgusting instructor and pupil alike with the instruction, because precluding spontaneous action and thought. When riding is moulded into forms, a certain stiffness of seat unsuited to the art of riding cannot help resulting therefrom.

H. What I mentioned above, I saw not in a cavalry regiment, but in the artillery.

S. The latter, owing to still greater lack of trained instructors, became more deeply entangled in errors. One thing more: A horse which is broken in a rational manner and with confidence in its rider, and under constant consideration of its nature and capabilities, and without being refractory, which is so trained that it becomes active gradually and in harmony with its physical capability and development, gains in beauty, health and strength. With ample exercise it remains fresh, likes to eat, and gains in muscle. A horse from which more is demanded than it can do, *i. e.*, whose training is hastened too much, or which is given false aids by an awkward rider, suffers pain. It does not feed well, digests poorly and loses strength. If a conflict has taken place, if the horse has gotten thoroughly heated and out of breath, it refuses food altogether, and appears next day for the exercise in an irritated, morbid condition. With the system of inspections at the end of each riding period, undue haste in training and frequent conflicts could not be avoided. Still more conflicts arise when incompletely trained riders are required to ride paces for which they lack as yet proper understanding

and use wrong aids. A horse which is being ridden faultily, comes in conflict with its rider, and goes only when forced by pain, is fatigued more in three-fourths of an hour than another in three or four hours which is treated rationally and remains in harmony with its rider. The latter horse may tire, but it gets hungry, feeds well and lies down on the bedding in the stable. The former becomes irritated, looks shyly around the stable, does not eat on account of nervousness, nor lie down at night. Thus the horses become poor and wretched. This was attributed to too much work in comparison with the food. They were ridden less frequently and for a shorter time. To allow them to recover, they were left in the stable sometimes more than once a week.

H. I used to know battery commanders who would not take a horse out more than four times a week.

S. Thick bellies were thus produced but not muscle. The fat overlying the muscle was mistaken for muscle. Much stress was laid on the condition of horses as to flesh. In disregard of the principles of FREDERICK THE GREAT, requiring at least two hours of daily exercise for each horse, the horses were fattened instead of being kept in effective, good condition.

H. Such horses were certainly unequal to long continued drill evolutions.

S. They were not even up to the small requirements then demanded from cavalry. With charges over 800 paces altogether (including walk, trot, gallop and full speed) with slow and circumspect drilling, horses which had accumulated fat on their lungs, were so run down that after every drill season they needed a spell of recuperation, only to again lay on fat. Thus, after the spring drills, from the beginning of June to the middle of July; thus, after the summer exercises and maneuvers from the middle of July to the beginning of November.

H. It is not to be wondered at that with such material, exertions as now put forth by every regiment like so much child's-play, could not then be risked when every cavalry leader was under constant apprehension lest he require too much of his troops.

S. And when I again recur to that fact, no SEIDLITZES were produced. This apprehension at the same time created a custom of making long marches at a walk only, then on account of a long time spent in the saddle on the march, taking a long rest dismounted before drill, and of remaining halted at ease a long time during drill. Long continued walking and halting killed the rider spirit

and delight, and suppressed spontaneous action. At the same time the horses were more and more weakened.

H. WRANGEL'S cavalry exercises in 1843 struck these practices like a cyclone.

S. Like a purifying thunderstorm, WRANGEL marked a new epoch for the cavalry. The year 1843 may be designated as the one in which the evils mentioned had reached their highest point. But before we speak of WRANGEL'S influence, we must turn to the effect of the squadron of instruction—the drill regulations and improvements in horse breeding.

H. That we will discuss the next time.

SEVENTH CONVERSATION, (FEBRUARY 7, 1886).—THE SQUADRON OF INSTRUCTION, DRILL REGULATIONS, SPORT AND PROFESSIONAL EQUESTRIANISM.

H. The formation of a squadron of instruction plainly shows that the lack of a sufficient number of riding instructors was properly appreciated in high circles, since it was intended to train the requisite number of them in this squadron of instruction.

S. Certainly! Speaking of the period from 1815 to 1843, I have no personal knowledge of the doings of the then squadron of instruction, and am not in a position to judge whether or not the proper methods were followed.

H. If we be permitted to judge by results, the answer is in the negative, for up to 1843 no progress in campaign riding was made in the army.

S. Whether that was the fault of the squadron of instruction, cannot be decided now. The squadron of instruction was attended by lieutenants and non-commissioned officers. They could not introduce into the army any change of system. From the squadron of instruction they returned to the troop, and had to instruct as told by their superiors. These latter did not take instructions from them; wherever, therefore, the superiors in the cavalry differed in their opinion from the graduates of the squadron of instruction, the teachings of that school could not be put into practice all at once.

H. According to that, such an institution would be altogether

useless, for the regimental and troop commanders cannot be sent to the squadron of instruction.

S. The effect of such an institution can become appreciable only when the graduate has come into command himself, *i. e.*, when he is a troop commander. We must remember how terribly slow promotion was in those days.

H. That is true. In 1838 or 1839 three second lieutenants in one of the dragoon regiments celebrated the twenty-fifth anniversary of their service in that grade.

S. Hence it is not to be wondered at if an officer who graduated in 1820 from the squadron of instruction, did not have an opportunity to direct, as troop commander, the instruction according to the system he had been taught.

H. It seems to me that the method adopted was not the best, most appropriate.

S. What makes you think so?

H. Several things. It happened in my time that some officer's charger was sent back to the regiment from the riding school or squadron of instruction as not suited, with the request that another be sent in its place. It was stated that the horse was suitable for service with the troop, but too weak for the school. Unsophisticated layman as I was, I thought that that school could not be suited to the service, for if the officers do not learn there how to make suitable service horses active, the cavalry derives little benefit from their training at the institution.

S. Your conclusion is correct. In those days when there was a general tendency to make the performances on the riding track the principal object, I should not be surprised if it was attempted to make a school horse of every horse in the squadron of instruction.

H. I also recollect a saying, very common in those days, that the officer who graduated from the squadron of instruction must forget what he had learned before he was again fit for service with the troop. During the period subsequent to their graduation, they were never seen riding except at a short trot in the circle.

S. That can only have been due to the same cause.

H. Furthermore, the non-commissioned officers who came from the institution, were, as a rule, too hard on the remounts in the beginning, or broke them down, until they had again become familiar with the slower method of training pursued in the troop.

S. It is much to be deplored that those in attendance at the institution do not sufficiently learn from the beginning how to break the young remounts. The officers bring their own horses, which,

however young they may be, are at least one year older than the horses that come to the troop as young remounts. The pupil does, therefore, not learn by practice how the horse should be trained from the beginning. He receives his instruction on horses already partially trained, strong and developed. When called upon to show what he can do, and to instruct a remount squad, he wants to get results too quickly, advances too fast, lacks thoroughness, fails to spare the young animals as he should, and ruins them.

H. This is more the case with the non-commissioned officers, who are more rude in the use of aids and not sufficiently educated to fully comprehend the instruction at the institution. I have hardly ever seen a troop really benefited by sending a non-commissioned officer to the institution.

S. If for no other reason than that they never have an opportunity of directing the instruction, because they never become troop commanders, I would prefer myself not to send non-commissioned officers to the institution as pupils, and rather use the money for training more officers there. I understand that it is contemplated, in official circles, to discontinue the sending of non-commissioned officers as pupils to the institution.

H. Was the system taught in the squadron of instruction the correct one?

S. As I said before, I cannot give an opinion. I should think, however, that in 1815 there still remained a sufficient number of old riders to furnish the requisite number of competent riding instructors for the squadron of instruction, revive the traditions of the correct system and diffuse them. We know of one who was a great authority—equerry SEIDLER.

H. He is the man I was thinking of. He certainly was a most excellent rider. His work was accepted as an authority. I cannot venture to give an unqualified opinion of him. I saw him myself in 1853, but did not know him well enough to give an opinion of my own. But I received my first instruction in riding from one of his pupils, and heard officers who had come from the squadron of instruction speak of him a good deal.

S. What did they find in him to criticise?

H. My first instructor in riding used much force toward the horses. Not infrequently he stood in the middle of the track and commanded: "Both spurs throughout the squad!" "And again!" "And once more for me!"

S. SEIDLER would hardly have approved of this, for such treatment is apt to ruin three months' work.

H. What was told me of SEIDLER himself would indicate that he also used force. "If the beast won't bend, break his bones!" This expression, which I mentioned above, was familiar in those days as one of his. He is said to have worked the horses very hard and broken down many which, with greater care, would have become good campaign horses.

S. It can only have been due to the fact that old SEIDLER himself received his first practical lessons in riding on that old, inferior material which needed the application of force and spur, and could not adapt himself, in his old age, to the treatment of a higher breed of horses. Confined as he was to the limits of the riding track, he may have lost sight of the needs of campaign riding—the more since in those days hall riding became the principal object of cavalry. He may have endeavored to make every horse a school horse, and ruined all those not strong enough for it.

H. Another reason, perhaps, why the squadron of instruction did not fulfill all expectations, was the fact that the number of officers instructed at one time was not sufficient.

S. And that the squadron was garrisoned at Berlin, where too much amusement detracted the pupils from the toilsome course of instruction. This point was taken into consideration about the middle of the century, and the squadron transferred to Schwedt.

H. We cannot, generally speaking, criticise an institution, whether we call it a squadron of instruction or riding school, for making riding its primary object. It is created for the purpose of imparting instruction in riding. The temptation to bring the art of riding to the highest perfection, is but natural. Under these circumstances it is pardonable if the instructor forgets that campaign riding is the principal object, and the art of riding only a means to the end. He practices his own line of the profession and wants to show what he can do. In order to constantly keep before his mind the object for which the art of riding is practiced, there should be some categorical, imperative orders from high authority to correct him and define the limits within which the art of riding is to be practiced as such, with the future instructors now under instruction.

S. This correction should come through the cavalry drill regulations.

H. Did not the regulations of 1812 accomplish this?

S. I cannot answer this question with an unqualified Yes. The regulations of 1812 contain too many movements borrowed from the infantry, and which, for correct execution, require much time and

fatiguing and useless exercises. I say useless, because they cannot possibly be required in battle and, by keeping the masses in motion without gaining ground, kill the real cavalry spirit; I mean that spirit which finds its element in the rapid forward movement. Still the regulations might have done, had more value been attached to what really pertained to the cavalry, and had such matters in the regulations as really pertained to the infantry found secondary consideration only. But the contrary was the case in the application of these regulations.

H. It needs only a reading of the directions published for the cavalry exercises near Berlin in 1821, to show that you are right. I read them in KAEHLER's work on the Prussian cavalry from 1806 to 1876 (Berlin 1879, MITTLER). When we read (page 33, subject No. 11) that a body of six brigades of cavalry or twelve regiments, or forty-eight sqadrons made a wheel in line at a walk, I fail to see when such a movement could ever be required in war and, if a change of front were necessary, how it could be made in time in this manner.

S. The same is to be said of the wheel of this large body of cavalry to the left rear with a change of front of ninety degrees.

H. What I cannot understand is, that these movements were prescribed by the same BORSTELL who, if we believe the diary of General VON LEDEBUR, proved such a fine cavalry leader in 1807.

S. It is difficult to solve this psychological problem. It is easy to say that he was now fourteen years older. But when we read the notes which he wrote twenty years later, for the preparation of instructions for the formation and use of large bodies of cavalry (KAEHLER page 62, et seq.), we recognize that during the last years of his life he still adhered to the correct cavalry principles. However that may be, up to 1843 the regulation drill of our cavalry became more and more pedantic and slow. The charge of 800 paces including walk, trot and gallop, was too short. The effectiveness of the charge was judged from the flank by the alignment, instead of by the vehemence of the shock, and from in front by the compactness, as was done by the Great King. The correct execution of ployments and deployments without gaining ground forward was placed above sharp riding. Movements of large, closed bodies, over miles of ground at a rapid pace were never executed. The leader was judged by the size of the horses' bellies rather than their efficiency as campaign horses.

H. When we take all this into consideration, it is not to be wondered at if the fresh, merry rider-spirit, was impaired.

S. Add to this the fact that promotion was so horribly slow as to be practically at a standstill. As second lieutenants celebrated the twenty-fifth anniversary of their commissions, so regimental and troop commanders remained in the same grade for nearly a quarter of a century. These gentlemen became settled in their posts and gave themselves up to personal comfort. Meritorious services performed during the glorious Wars of Liberation caused them to be judged with forbearance during the long peace. The very possibility of a war began to be disbelieved. The demands on cavalry in war were forgotten, and it was preferred to move cavalry slowly in order to preserve a splendid appearance.

H. And yét the improvements in breeding produced a class of horses which became nobler and more perfect every year, and capable of greater efforts than formerly.

S. That was unknown then, because the efficiency was never brought out by tests. The material worked itself into shape but in a different way.

H. According to this the horses taught us how to ride properly.

S. It sounds paradoxical when stated so tersely; and yet there is a grain of truth in it. As a well trained horse trains a rider, so the existence of a good breed of horses must influence the rider-spirit in a country. The mutual relations between rider and horse exist in large bodies as well as in individuals.

H. In what way did the improvements in horse breeding tend toward good riding?

S. By a circuitous way—through sport. The government improved and encouraged horse breeding in the country in every way. Private studs were thus improved. The society for horse breeding and horse training came into existence. Races were arranged after the manner of the English. On the race track the value of the breed was put to the test. The different studs competed there. The government encouraged the races by offering prizes; the reigning families, by their presence at the track.

H. I have never considered the winners on the race track as good campaign horses.

S. No more than jockeys as good campaign riders. But it is to be observed how many horses a stud must raise before it can register one winner on the race track. Most of the horses bred are not taken into training at all.

H. Thus the owners of the studs raise most of the horses to no purpose, and pay with enormous sacrifices in money for the vanity of seeing their studs once credited with a winner.

S. It is not vanity alone that makes the breeder try to produce a winner. If he is so very fortunate as to produce a winner, it brings him much money. It helps him over many a year of loss, as a good vintage does a wine grower. In 1865 GLADIATEUR brought in 1,046,142 francs without counting the bets. Nor are all the other horses which must be raised, raised to no purpose, though they be not suitable for the track. The country gets the benefit, for those not suitable for training, as well as the racers that fail to win, are sold into the country and improve the stock down to the farm horse. The farmer who got but one foal from his mare, eventually found out that he got a more efficient animal by crossing the blood of his weak animal with that of a nobler one. This produced "half blood," the best breed for campaign horses. There were then quite a number of studs which principally raised half blood and furnished most excellent campaign horses. I have much deplored their discontinuance, and name only the studs of the government of Mecklenburg and those of Ivenack and Senn, although there are many others.

H. The race track showed what a horse could do. It also showed that the size of the horse's belly is not the measure of its quality, which should be judged by the power and development of its muscles and exercise of its lungs. It is not at all flattering to our cavalry that it had to learn from civilians, and they in turn from England, what a horse could do.

S. It certainly must have been galling to the pride of SEIDLITZ'S and ZIETHEN'S successors. They objected to races as idle play. The aging cavalry leaders would have nothing to do with them.

H. The ardor of youth, however, seized upon the sport with enthusiasm. At the time when I entered the service, the giddiness which had seized the heads of the young riders was at its highest.

S. And by its exaggerations increased the opposition of the old men, and justified the same. These sometimes extremely ridiculous exaggerations, generally known under the name of Anglomania, did much to retard the good influence which the sport can exercise upon cavalry. I remind you of some of the figures we used to see on horseback then.

H. Whoever wanted to be considered a good rider shortened his stirrups until his knees were even with the pommel of his saddle, sat far back on the cantle, curved his back, bent his head back, hung on to the reins with his fists, called "Ho! Ho!" to the horse, see-sawed trotting, turned his fists in a circle when gal-

loping, and presented a most ridiculous figure, eye-glass, cigar and riding-whip being unfailing accompaniments.

S. It is not surprising that such figures should rouse the opposition of the cavalryman.

H. I remember the time when officers were punished by arrest for riding the English trot. To-day we teach the cavalry private the same kind of trot for easing him and the horse at long trots on the march.

S. Unfortunately this "light" trotting is seldom correctly taught even now. Most riders ease thereby themselves only, not the horse. There are but few who have learned at all to be particular about changing the horse's foot on which the rider rises in "light" trotting, and not working one foot more than the other.

S. Most riders also lean too far forward, placing undue weight on the forehand.

H. Nor was the condition of our race horses of those days calculated to please our cavalry authorities, used to highly-fattened horses. Whenever a half-starved horse appeared on whose protruding hip-bones a hat could be hung, it was immediately called a racer.

S. Another excess of the Anglomaniacs consisted in not only reducing the horse's fat by training, but his muscles also. Because a lean nag could run faster than a pot belly with his lungs full of fat, the Anglomaniacs believed for some time that a half-starved appearance was the necessary attribute of a good racer. This, however, did not last long; speculation and competition soon overcame this prejudice, for experience showed that a horse with well developed muscles was more enduring and faster than a starved one. Correct training, with an ample supply of good, nourishing food, puts a horse in such good wind that fat will not form on the lungs, nor add to the weight by growing under the skin, and that the muscles will become strong. For this reason the winners on the race track are, with few exceptions, the most beautiful horses, a thing that could not be said of them formerly.

H. Yet there still exists a certain contrast between race and campaign horses. You cannot deny that.

S. Not a contrast, but a difference. This difference consists mainly of two things: The jockey on the race track does not need more command over his horse than is requisite to make it pass over the track as fast as possible. The campaign rider must always have his horse under control. He must be able to halt at any moment or turn to engage in individual combat. In the one race which he rides, the jockey takes out of his horse all there is in it, without

caring what becomes of the animal afterward; for the one victory, perhaps, brings in more than the horse is worth, if not in spot cash, yet in reputation for the stud. The campaign rider must keep his horse in serviceable condition as long as possible, and get out of him the greatest possible exertion for many years, daily, I might say.

H. Therefore the jockey stoops over and gives to the horse a support by the reins, the so-called fifth foot, to enable him to use the hindhand merely as propelling power, while the short fore-legs merely serve to support the weight of the body. The campaign rider, on the contrary, must sit with his center of gravity over that of the horse, in order that a disturbance of the equilibrium in any direction may not withdraw the whole machine from the rider's control.

S. For this reason the jockey sometimes begins training the horse at an age at which the campaign rider allows his horse to disport himself in the pasture. Just think of the races of two-year-olds.

H. Many horses that go on the track as two-year-olds break down and are then fit for breeding purposes only.

S. That is a matter of indifference to the jockey, and must be, as long as he wins. But a campaign rider must not break down any horse before it has served its time. It is always a reflection on him to break his horse down prematurely.

H. Just now you mentioned the training of the horse, with which the jockey begins. I thought that race horses were not trained at all.

S. They are; they are trained like campaign horses and those that are to go to the high school, and if they are trained rationally, they are all trained according to the same principles. The only difference is in the degree to which the training is carried. All horses that are to be saddle horses must first be taught to stand saddle and bridle, allow the rider on their back, turn and halt upon the pull of the bridle, and move forward upon the application of whip and spur. The manner in which an intelligent rider gives a horse its first lessons, is the same for all saddle horses. When the jockey has reached the degree of training with a horse intended for racing on level ground, he rests satisfied and does not carry the training farther, if for no other reason than this, that a higher degree of training, erect carriage and perfect equilibrium might interfere with the hare-like conformation of the legs and back, and thus with the speed which, in a racer, is the main point.

H. Then you think that the training required to make a serviceable campaign horse impairs the speed?

S. It is beyond a doubt that a horse, which by training has become perfectly balanced, cannot develop the same speed on the level track as the racer which uses the front legs merely to support his weight and the hind legs for propulsion, exclusively, all other circumstances as quality, of breed, etc., being equal.

H. Your author of "New Rider Sermons" is of a different opinion. He insists that a perfectly broken horse must develop the greatest speed on the level track.

S. Should he ever make the experiment, he would convince himself of the contrary. But we are perfectly willing to put up with this in the campaign horse, because through rational training he gains in endurance. He is not used up so quickly; not to mention the fact that the racer is not sufficiently in the rider's control to be used as a campaign horse.

H. Races on level ground are not the only ones; we have hurdle races and steeple chases also.

S. These two kinds of races require a different degree of training. For this reason they are rarely ridden by the jockey, the owners themselves mostly riding. The object of the training for racing on the level track is merely to get the greatest speed without losing control of the horse. For this reason the race on the level track is so very difficult to ride. BALLY's book on horse breeding (Hallberger, Stuttgart, 1836), gives an idea of it in the twenty-second chapter. The horse, not yet thoroughly bent or supple, is to be kept in the rider's control by a firm seat and correct use of the reins, the obedience, the carriage is to be such that it never gallops crosswise, but before coming to a turn, gallops correspondingly, and turns the corners as short as possible, with a corresponding gain of ground.

H. You speak of the firm seat of the jockey?

S. Certainly! the firm seat of the good jockey knows no other rules for the position of the middle part of the body than any seat of a good rider, but is much harder to maintain because the fists have to hold much more weight, and the upper part of the body must frequently be bent forward to take the weight off the hindhand, giving it liberty to act for propulsion only. We must not mistake the jockey's seat for that of the Anglomaniac. Good English jockeys sit quite differently from their caricatures. As soon, however, as obstacles are to be taken, a bent, supple horse has more chances than

a stiff one that has to be held by force. There the jockey's good riding no longer suffices. The horse must also be made obedient.

H. Yet we see not infrequently that winners on the level track are not beaten in hurdle races.

S. Mere hurdle races do not require much obedience of the horse toward the rider so long as the former is ready and eager to jump. In hurdle racing the rider of a capricious horse is not ashamed if the horse refuses an obstacle. He says: "He doesn't care to jump to-day; he doesn't seem to have slept well." This is not allowable for the campaign rider. His horse must jump at any time whenever he wants it, whether the horse likes it or not. Training must bring this about.

H. For this reason only those of the racers on the level track are used for hurdle racing which jump readily. I frequently heard the expression: "The horse has no heart at the obstacles; it is only good for racing on the level track."

S. The campaign rider, on the contrary, must be able to get every horse in the troop over the obstacles. For ordinary hurdle racing, also, a different degree of training is required from racing on level ground. Still more for steeple chasing, and yet more for hunting.

H. I have never seen or heard that a horse which was being trained for the hunt received a special school training.

S. You have read it anyway, for you have read BOSENBERG'S "Chance Ideas," where he says, "A whole light-house dawned upon me." He is describing the moment when he recognizes what a high degree of command of the rider over the horse, of suppleness on the part of the latter, is required in order to have the least prospect of success in steeple chasing, and how WILANOWITZ bent his race horses. It has recently been ascertained that for hunting, a bent, supple horse has far better chances than one that is not bent, and has to be held by force. Our leading hunters now train all their horses to obedience, even pillars being used. The great body of Anglomaniacs does not know this, and does not want to know it, because it entails too much work, and for this reason they are invariably beaten.

H. In accord with what you say, is my remark, that the gentlemen who were considered the best riders in racing with obstacles, and were the most successful, assumed a seat almost like the regulation cavalry seat. How beautifully WILANOWITZ sat on his "Anvil." There is a picture of it in existence somewhere.

S. Because altogether there is but one seat, particularly only

one slope of the thigh which gives the greatest command over the horse. Whoever wishes to guide his horse safely over obstacles, must sit correctly. He can and will indulge in "eases" which we do not allow the recruit; eases, which at times of great exertion diminish fatigue; he probably will, for instance, advance the lower thigh farther when he is not using it, ease his spine, etc., while the most important part, the middle of the body, remains unchanged. And as soon as the rider approaches an obstacle you will notice him taking a smarter seat. His lower thighs are brought back, also the upper part of his body, and the center of gravity of the horse is again more nearly placed under that of the rider.

H. Does the horse lose speed through the degree of training necessary for hurdle racing?

S. There can be no doubt of this, though the loss may be so small as to be barely perceptible.

H. Yet there have been horses which, in racing on the level track and with obstacles, defeated everything for some time.

S. Because there have been horses which by nature were faster than all others. There the loss was not so great as to counterbalance the difference of their natural gift.

H. The same might be said of the hunts as of hurdle race with obstacles.

S. Almost, not quite. For steeple chasing the horse must be better in hand and more supple than for hurdle racing, for the question is not only one of making a few jumps on a track otherwise most favorable for the horse, but of riding over all kinds of ground, smooth and broken. During the whole of the steeple chase, barring perhaps the last part, the rider must have control over his horse. Its suppleness must even be greater.

H. This may account for the fact that some good campaign horses, ridden by officers on service, beat race horses in steeple chasing.

S. You know from the time required to pass over the ground that the average speed in steeple chasing is less than on the level track or in hurdle races; this is due to the high degree of training and to the balance which steeple chasers must possess.

H. Then you place steeple chases and hunts on the same level?

S. Not quite. Hunts and campaign riding are on the same level; both require the same degree of training; in both the rider must retain constant control over his horse. In steeple chasing the final question is of one horse being a half a minute speedier than others; in campaign riding and hunting this is a matter of indiffer-

ence, the only question there is of the rider's correctly managing his horse. For steeple chases, therefore, horses are made obedient, taking care, however, not to cause too great a loss of speed by the schooling; a horse may, therefore, win steeple chases without being a good hunter or campaign horse.

H. There you are right; we had a striking example of that in the War of 1864. Major A., of the General Staff, one of our best horsemen, accompanied a platoon of cavalry out on reconnaissance; a somewhat smaller troop of the enemy retired and was pursued. Cocktail, the Major's horse, a well known winner of steeple chases, thought it was a race, and outstripped friend and foe against his rider's will. Fortunately, he kept the left side of the road, which was frozen and had ditches and hedges alongside, so that the Major could parry to the right the weak, left cuts of the Danish dragoons, until he had ridden through their "pulk," and, reaching a cross-road, was able to turn off, while the enemy continued straight on.

S. Cocktail, being intended for a steeple chaser, had prevented his getting that amount of training and schooling which is required for a campaign horse. You see, both methods, steeple chasing and campaign riding (on the hunt), end in the long gallop and shock, *i. e.*, in the "finish." But the methods of the final schooling of the horse, and of the action of horse and rider, must be kept strictly apart. The steeple-chase rider, while allowing his horse a low position of the head and neck, allows ample play for the hindhand, manages the horse firmly with both hands firmly feeling his mouth, and takes care not to disturb it in the jump from a gallop. When it comes to the finish, the fight, he does everything to bring out its full speed; it makes no difference whether or not the horse can be stopped immediately after passing the finishing post. It is imminently proper and absolutely necessary for the race horse to look to the reins for support. The campaign horse's mouth, on the contrary, must not be felt too firmly, because but one hand is available for the reins; it must be capable of being stopped at any time, even when the hindhand is under the body, or of making a short turn. It must be accustomed to carry itself and to go with loose reins, *i. e.*, quite lightly drawn reins, and to look out for its own safety. In dense, closed columns, in the rear rank, in dust, in the dark, in the smoke of powder, the soldier is unable to see the road. During evolutions in closed formations his attention is otherwise engaged by the service; the horse must also be accustomed, suddenly, without any run, to jump high or wide; in short it must always take care of itself and preserve its balance in any event. For these reasons

the long gallop must be ridden with a certain reservation, and the better gifted horses must be able to regulate their stride at the gallop by that of their less gifted fellows; the same holds good of the shock, the efficiency of which depends upon the ranks being closed.

H. Did I understand you rightly in saying that the best training for the campaign horse is also the best for the hunter?

S. Beyond a doubt.

H. And yet there are many hunters which still have such difficulties of neck and spine that at the beginning, before going any sharp pace, they are out of hand and would not do for troop horses.

S. They are not the best hunters and, at the beginning of the hunt, when not yet under the rider's control, unsuitable for it; for if the hunt should happen to be so short that the rider does not get control over his horse, he is not in at the death, and continues to bolt, under shouts of laughter of the others.

H. But, on the other hand, there are many hunters, although never regularly trained, yet going faultlessly on the hunt.

S. I told you before that it makes no difference whether the required degree of suppleness, balance and obedience is gained by rational work at gallop on a straight line, or at a trot, partly on the circle. The degree of training to be attained remains the same; but whoever goes to work systematically and according to the irrefutable principles of the art of riding, having due regard for the individuality of each horse; whoever works young horses, step by step, rationally combines bending, trot and gallop, will reach the desired end, while sparing (nay, increasing) the horse's strength more than the rider who starts in with the hunter's gallop and has control over his horse only during this gallop.

H. What you say agrees with what PLINZER (in his excellent work on the horse gymnasium) says about the training of the racers, hunters, campaign and school horses—that there should not be any difference in training; that racers, hunters, and campaign riders and hall riders have no cause for quarreling with one another. It is a pity PLINZER called his book "Gymnasium," a title which is apt, perhaps, to deter any practical rider from reading it, for enthusiastic riders, it is well known, rejoice when they have no longer anything to do with a gymnasium.

S. ROSENBERG says the same as PLINZER, only in different words. This most experienced hunter and steeple chaser of the present time lays the greatest stress upon obedience of the horse, bending and rational schooling. That both are right you may judge from the fact that members of reigning houses taking any part at all in

sport are, almost without exception, able to ride very correctly. Their horses, trained by equerries, are, without exception, rendered obedient according to the principles of the school, and trained to the degree requisite for hunting and campaign riding.

H. These gentlemen also have the means to buy new, good horses whenever the old ones are ruined.

S. They have the means, yet they do not need them, for frequently they ride their horses longer than other riders. How old did "Sadowa" become under the Emperor? She was, as campaign horse and hunter, equally good.

H. What do you think of the paper chases?

S. Paper chases are the best school for campaign riding, because the ground can be selected as most suitable for the quality of the horses, and the degree of training of horse and rider; they furnish the best means for pushing hunting and campaign riding to the highest degree of perfection.

H. Whenever I had anything to say, I treated paper chases as riding instruction on the terrain.

S. A riding instruction which, in the shape of pleasure, increases the love for it. The paper chase is the school; the real chase the examination, the proof of the example.

H. The paper chase has this further practical advantage over the real chase, that it can be indulged in without damage to the fields, which makes it less expensive, and it can therefore be engaged in by those less well off.

S. That is correct. It is to be regretted that not all cavalry officers have the means to ride in real chases.

H. When considering how racing, hunting, campaign and school riding go hand in hand, one can hardly think it possible that there was a time when most of the authorities of the cavalry (I mean the time previous to 1843) held racing and hunting in disfavor.

S. The hunters of those days, especially the young gentlemen, were mostly to blame for this; the parodied racing-seat which they affected, when protected against official censure by the red hunting-jacket, could not but offend the eye of their superiors. They also took every opportunity to express their dislike of systematic instruction in the hall. We used to hear such expressions as "The fooleries of the riding track are things of the past," "An intelligent rider considers the horse only as a means of transportation to carry him from one point to the other as quickly as possible; how, is a matter of indifference," etc.

H. Add to this the excesses occasioned by the "par force"

chases; I mean those of the cup and games of chance, and many catastrophies of a financial nature.

S. Then everybody says: "That comes from the sport, from the Anglomania." And the aged superior was no longer aware that behind this censure there was hypocritically hidden a dislike to continuous fast riding, for which he no longer possessed the necessary elasticity. If the old cavalry leaders of 1843 had, on an average, been as young and nimble on horseback as they had been in 1815 in almost the same positions, they would themselves have taken up the sport and chases and produced good campaign riding, while at the same time having an opportunity of preventing, by their presence, the excesses mentioned.

H. Against a return of such unfavorable consideration on the part of the superiors we are now safe. I need only mention that last fall we read in the papers of two cavalry generals riding a bareback "par force" chase of several hours' duration.

S. Just at present we are on the right road in this direction; but it is not without advantage to recall how formerly we went astray and may stray again, unless we remain "*toujours en vedette.*" The danger now rather is that a thorough school training may be undervalued, and that as a school training be considered what is merely a superficial, dilettante production, not unlike the circus productions which are mistaken for the art of riding by the public at large.

H. It is queer that at the same time when we were seized by the Anglomania, circus riding attracted more general attention.

S. It was due to the fact that in the riding public there was an instinctive and unexpressed feeling that both had been neglected, the bold riding forward and the art of riding properly.

H. The latter found a place of refuge in the circus.

S. But what a one! Just as the great riding public replaced thorough campaign riding by the production of the race course, thus it mistook circus riding for the art of riding. Neither requires years of labor in order to thoroughly bend a horse and make him active. The trainer gallops the horse for a few months and then wins victories and applause on the race course; the circus rider teaches his horse in an equally short time a few tricks that bring him money and unmerited applause.

H. Did not the high school, as produced in the circus, have at least the good effect of reviving general attention and interest for the art of riding?

S. But what we see in the circus is not the art of riding.

H. I will not mention the jumping through hoops, retrieving by horses and kneeling. These are productions for the eye, given for a change, to attract and amuse those that have no knowledge of riding. I mean only the high school as it was ridden there by individuals.

S. Barring a few horses trained by STEINBRECHT and bought by RENZ, it is not the high school at all that was ridden, and the fact that such productions were called and acknowledged as high school, served only to dim the definitions. If you look closely at the "passage," "piaff," etc., of most circus riders you will find that the hindhand is brought under and bent in order to carry the forehand, but that the hindhand and haunches remain stiff. The horse makes motions with the forehand which it has been taught by hunger and timely feeding, whip and sugar, and because the circus rider does not take the time to make the hindhand supple, as can be done only by years of labor, the horse is dragging the hindhand. It cannot get it under. When it is to bring the hind legs forward, it brings them out sideways because they are too stiff to place under the body.

H. The circus rider has not the means to train and feed a horse for years. It must bring in money at an early day.

S. It forces him into that superficiality with which he dresses instead of trains, treats horses like dogs instead of as horses. That is not riding; for riding is the art of making horses unconditionally obedient to the rider. Should, however, the circus rider once ride the horse in the open, on which he rode the high school in the circus, he would not get it by a hay wagon or hunchbacked woman if it shied and did not want to pass, for he has no control over it. It does not obey him.

H. But when invited by officers, RENZ rode quite well on the terrain, to the surprise of the *connaisseurs.*

S. Yes, on the horses which STEINBRECHT had broken to the school, and which he had bought. It is not impossible that RENZ had sufficient knowledge of the art of riding to train a horse thus himself. Otherwise, he could not have presented a horse broken to the school by STEINBRECHT. But as you stated very correctly, he had no time for it. When superficial productions on miserably trained horses brought in just as much money, why should he waste his time on the exact school?

H. Do you remember the sensation caused by BAUCHER's book, about 1840?

S. That very sensation proves the poverty of those days in true riders. You have read how PLINZNER criticises BAUCHER?

H. Certainly! At the end of every chapter he waxes warm against BAUCHER. I think, however, that PLINZNER knows the much talked of BAUCHER by his book only, and never saw him ride. Even the sentence from a letter which he said he received from a Prussian officer—"La cavalerie Prussienne, pour maintenir sa réputation, s'est vu obligée d'adopter votre manière d'équitation"—made me indignant.

S. And after you had seen him ride, did you change your opinion?

H. I modified my opinion so far at least as to make use of the opportunity for observing his system in actual practice, and forming an opinion based upon facts. For as I have stated once before, I believe that language is insufficient to express everything about cavalry so as to make misunderstanding impossible. About the middle of our century, BAUCHER, who then rode in DEJEAN'S circus, in Berlin, offered to show his system practically to a number of officers in a course of thirty hours.

S. Pardon me, please. But whoever wants to train a rider in thirty hours, has ideas of riding which I do not care to share.

H. BAUCHER did not mean to do that. He intended only to teach his system practically to eight officers who had been riding for years, in thirty hours, because he had found out how much his book had been misunderstood. He knew, as well as you and I, that riding could not be learned so quickly. On the contrary, he was opposed to all undue haste in training horses, and his motto was: "Plus vous allez lentement, plus vous irez vite," as I said once before.

S. Nothing is to be said against the appropriateness of this motto.

H. I gradually recognized, as I rode under him, that in the eyes of intelligent riders no one had hurt him more than those who rode by his book and had, moreover, failed throughout to understand him.

S. He expressly sets up the principle that the horse should be "behind the bridle," when everybody knows that all control over the horse ceases whenever it is behind the bridle.

H. Here the poverty of the language played him a mean trick. He demanded, like any true rider, that the horse should be "between thigh and bridle," and logically infers that, therefore, it must be "in front of the thigh" and "behind the bridle." The whole dispute was about the meaning of the expression. What he calls "behind the bridle," our school riders call "at the bridle." Where we say of a horse that it is "behind the bridle," BAUCHER says that it

is "behind the thigh." He means the same thing, but uses different words.

S. I wish, for his sake, that you may not be mistaken.

H. I cannot omit to mention, that BAUCHER had extraordinary strength in his thighs, and was able, without the aid of spurs, so to squeeze his horses that they stepped forward from sheer fear. Thus it came that he managed the horse, apparently, with loose reins, *i. e.*, by the mere weight of the reins.

S. The rider of the high school attained the same on a perfectly broken school horse.

H. I must also honestly confess that, in his instructions, BAUCHER supposed every rider capable of the same thigh pressure as himself.

S. In that case his system was not suited for all riders.

H. I gladly admit that, as well as that I would not have dared to ride the horses broken by him. For this very reason all those who ride by his book only, work the horses mostly "behind the bridle," according to our ideas, and ruin his reputation by rendering their horses restive and fretful.

S. That comes from commencing with handwork without rider.

H. The injurious consequences of which are not removed by the strength of BAUCHER'S thighs.

S. BAUCHER rejects the snaffle and gives every horse the curb at once.

H. Yes.

S. That is why he cannot thoroughly bend back and haunches.

H. He considers the bending of the haunches of great importance; bending of the back he considers an illusion.

S. For this reason his horses are bridled too high, with curved back, carry the nose against the chest, and show a faulty break in the curve of the neck back of the head.

H. You must not forget that he rode for the circus only, and that circus productions alone were the object he sought to accomplish.

S. What is one to do with such a system for the purpose of campaign riding?

H. I never thought of recommending the system for campaign riding, pure and simple.

S. Apropos, I have discovered ground on which we can agree.

H. I never doubted that. BAUCHER does not show all the evolutions of the high school on every one of his horses. Whenever this or that horse showed itself unsuited for something, he would not require it of the horse.

S. Then his riding is to the correct art of riding the same as

JAHN's method to the Swedish gymnastics, the principles of which are now prevailing in our army. By the former, every individual exercises wherever he chooses, by the latter all the muscles are strengthened.

H. The comparison is a good one.

S. Still BAUCHER's riding is more like the training of a dog than horse breaking.

H. At any rate he carried to perfection the entering into the horse's individuality and its mode of thinking. He placed himself in the horse's state of mind and talked horse language to it, so to speak. He did not employ aids as a forcible means, but as a means of making himself understood. He rewarded the horse every time it obeyed the rider's will.

S. With sugar or food?

H. Yes, the crude animal in the beginning, later on only by caressing and praising, and whenever anyone would omit to do so after a horse had done a thing well, he would call, "*Caressez donc, barbare!*" The horse's usual reward consisted in having the aids relaxed.

S. I am very much opposed to placing, every few moments, the reins on the horse's neck with extended hands and arms, as is so frequently seen. It is unpractical and does not look well. The horse is sufficiently rewarded when the pull and pressure cease, but the horse must remain "at the bridle;" that is what the horse is to learn. The total abandonment of the effect of the bridle was caused by the perverse idea that the horse must be broken from front to rear, and that the hindhand is to be worked afterward. Because the horses had not been thoroughly bent, they sometimes proved refractory when required to be "up to the reins," and the rider gave them the reins to avoid evil consequences. Many riders do it from a kind of coquetry. They have seen it on the race track and believe that it is part of good riding. They do not suspect to what they expose themselves and their knowledge of riding. It is a fashion. Formerly the art of riding before spectators consisted in not showing any of the aids. Now the aids are always used. Every time the horse is given the reins he loses his carriage.

H. BAUCHER did not do so invariably, but only when he meant to rest the horse. The usual reward was a relaxing of the aids, so slight, however, that only a connoisseur could notice it.

S. That is nothing new. The old high school teaches that too.

H. Still I think that the old high school used more forcible means than BAUCHER, about such as would be appropriate for the

former inferior breed of horses. BAUCHER has certainly contributed much to the fact that our most skilled equerries treat the superior breed we now have more humanely, enter into the animal's way of reasoning, and do not tame it by mere force.

S. At this conclusion the high school would have arrived without BAUCHER, by the mere association with a better breed.

H. At any rate BAUCHER was not such a bad spoiler of horses as PLINZNER describes him at the end of every chapter. He was an intelligent man who had had to do with horses all his life. I concede that all those who work by his book, without understanding him correctly, spoil horses.

S. Then he becomes a spoiler of horses, indirectly, by means of his book.

H. Anyone may be misunderstood; so may PLINZNER, and he is certainly not a spoiler of horses. I have also conceded that I do not consider BAUCHER'S method applicable to campaign riding. But I find that he has much that can be used to advantage and has been used, though with some modifications. At any rate he made a great sensation in his days; turned attention again to school riding at the time of the Anglomania, and gave rise to thought and discussion. And if he had invariably been wrong, but yet had succeeded in restoring the old method to its full authority, in arousing interest in it, that would have been a merit in itself.

S. If it were his only one, it would be a negative one only.

H. Yet there is something positive in it. Even KAEHLER acknowledges that BAUCHER'S system produced, among us also, greater activity in this field of the mounted service.

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HISTORICAL SKETCH OF THE ORGANIZATION AND TACTICS OF MODERN CAVALRY.*

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"An army deficient in cavalry rarely obtains a great victory, and finds its retreats extremely difficult." — *Jomini.*

AT the time of the invention of fire-arms, the cavalry consisted of men-at-arms, armed with the lance, sword and dagger, to which were generally added the battle-axe, battle-hammer or mace. Literally iron-clad himself, and with his horse further weighted down with defensive armor, the cavalier of this epoch had reduced mobility to a minimum, and in seeking protection from the weapons of his foes, had well nigh deprived himself of the power of injuring his enemies in return. Invincible when opposed to the miserable, unarmored, foot troops of his time, he was unable to penetrate the armor of an opposing cavalier, and warfare between men-at-arms had become almost bloodless. At the battle of Zagonari, in Italy, in 1423, the only men who lost their lives were three knights, who, having fallen from their horses, were drowned in a morass. At Agincourt some of the French knights, being unhorsed, were unable to rise from the mud, and were ridden over and miserably suffocated. The charge could be made only at a slow trot, and altogether the cavalry was at the lowest ebb of military efficiency.

The introduction of gunpowder as a military factor was at once felt by the cavalry. Already overweighted with iron† the cavaliers made a vain attempt to neutralize the new force by adding to the thickness of the armor, and it was next sought to adapt fire-arms to

*From the advance sheets of "Organization and Tactics," by permission of the author.
†The armor of a knight frequently weighed 200 pounds.

the use of the cavalry. To this end, the petronel was introduced. This weapon consisted of a simple iron or brass tube, with a touch-hole on top, fixed on a straight wooden handle, which was rested against the breast in firing. The muzzle was generally steadied by a rest with a fork, which stood up from the pommel. These weapons were introduced about 1375, and were subsequently much improved and developed into the arquebus, which was fired from the shoulder, and furnished first with the match-lock and afterwards with the wheel-lock. The proportion of arquebuses to lances was one to four. Too slow and unwieldy to deliver effective shock, and with fire action incomparably inferior to that of the rude, but improving, infantry which it now encountered, the cavalry of this period was all that cavalry should not be; and MACHIAVELLI, writing about 1515, declared that "well organized infantry could hardly be beaten except by infantry."

The pistol, invented in 1521, and soon introduced as a military weapon, added considerably to the power of the trooper, though the tactics adopted shows how far the mounted arm still fell short of its proper function. The German cavalry was now formed in deep bodies, habitually in seventeen ranks. It made no attempt to use shock action, but rode up to the enemy without charging, and when at close range the front rank discharged its pistols and wheeled to the right and left at a trot, unmasking the second line and re-forming in rear to load. Each rank repeated this maneuver in turn. For a time this tactics seems to have worked well; but the French cavalry finally adopted the tactics of charging with impetuosity while the Germans were firing, and almost invariably overthrew them.

Great improvements in the German cavalry were made by CHARLES V. In imitation of the French organization, the cavalry had been formed into unwieldy companies of some 600 combatants; CHARLES now organized it in squadrons of 400 troopers each, and reduced the number of ranks—first to ten and afterwards to eight. HENRY IV., of France, introduced a still shallower formation of six ranks.

The tactics of this period shows a peculiar intermingling of cavalry and infantry. In many cases musketeers on foot were interspersed among the troopers, and as the latter charged at a slow trot, were able to keep up with them. By their fire they aided in breaking the enemy's ranks, which were then overthrown by the cavalry. The intermingling of individual musketeers and troopers seems not to have given satisfactory results, though the combination of bodies of infantry with those of cavalry was happily used by HENRY IV.

at the battle of Coutras, in 1587. In that battle the infantry was placed on the flanks and the cavalry in the center. Between the different squadrons were placed small bodies of select musketeers, twenty men in each, formed in four ranks, the first lying down, the second kneeling, the third stooping, and the fourth standing erect, so that all could fire simultaneously. The attack of the Royalist cavalry was awaited until it arrived within twenty paces, when the infantry fired a volley, and the Huguenot cavalry, immediately making a counter charge, drove the Royalists from the field.

The lance gradually disappeared, and the armor of the cavalry was lightened as its inability, even at its heaviest weight, to resist musket shots became more and more manifest. In the time of MAURICE OF NASSAU (1584–1609) the cavalry was provided with cuirass and helmet, and armed with pistol and sword. Like the infantry, the Dutch mounted troops were brought to a much higher state of efficiency than their adversaries. When charged by the Spanish cavalry, they fired a volley, then opened out quickly from the center, and, sword in hand, charged their opponents on the flanks.

About this time squadrons were formed into regiments, and the number of ranks was reduced to three. Dragoons now constituted a portion of the cavalry of each army. They were first employed by Marshal DE BRISSAC in 1550, and were originally mounted infantry, fighting on foot, using their horses merely for transportation, but they assumed more and more the characteristics of cavalrymen, and finally became a body of troops trained to fight either on foot or on horseback.

The Thirty Years War.—The genius of GUSTAVUS ADOLPHUS was manifested in every branch of the military art, and especially in organization and tactics. The reforms in the composition and employment of mounted troops made by that great commander were scarcely less than those made by him in his infantry. He organized his cavalry in troops of seventy men each, grouped them into regiments consisting of eight troops, and reduced the number of ranks to three. The cavalry was divided into heavy and light; the former being provided with cuirass and helmet, and the latter having no armor. The cavalry had been accustomed to caracoling; but this was now forbidden, and it was directed to charge straight on the enemy. The men of the first rank fired their pistols, drew swords, and closed with the enemy; the second and third ranks supported the first, and generally reserved their fire until the hostile line was broken. The action of the cavalry was essentially by shock, though the charge was still made at a trot. GUSTAVUS is said to have at-

tached small pieces of artillery to his cavalry, thus really originating horse artillery; but this is doubtful, and there is no authentic account of such use of artillery until the time of FREDERICK THE GREAT.

The Imperialists opposed to GUSTAVUS a heavy cavalry composed of cuirassiers, carbineers, dragoons, and a light cavalry of Croats and hussars. The light cavalry was chiefly used in the minor operations of war, the main reliance being placed upon the heavy cavalry for the work of the battle-field. The latter was formed by TILLY in ten ranks, and by WALLENSTEIN in eight. The cuirassiers were heavily armored, and were lacking in the essential quality of mobility; and all the heavy cavalry depended principally on fire action. The carbineers fired by successive ranks, retiring to load. The cavalry of the Imperialists was inferior in composition, arms and tactics to that of GUSTAVUS, and the Swedish cavalry largely contributed to the two great victories of Leipsic and Lützen.

The Wars of Louis XIV.—It is remarkable that the long wars of LOUIS XIV. produced no material change either in the organization or tactics of cavalry. MARLBOROUGH used cavalry with telling effect, and his great victories of Blenheim, Ramillies and Malplaquet were largely due to the decisive use made of this arm; but the cavalry still relied on mounted fire action, and the charge was made at a slow pace. MARLBOROUGH used his cavalry in large masses, and to this and the fact that the French cavalry was armed and trained in a manner similar to his own, was his success due.

Contemporaneously with the later campaigns of the Spanish Succession, were waged the wars of CHARLES XII., of Sweden, with the Danes, Saxons and Russians. CHARLES abolished all defensive armor, armed his cavalry with the long, straight sword, especially adapted to thrusting, prohibited the use of fire-arms on horseback, and taught the cavalry to charge at full speed. The true *rôle* of cavalry was now beginning to be understood. In the reign of LOUIS XV. the lance was revived in the French cavalry, and the cuirass and helmet were replaced with the buff-leather vest and saber-proof cap. Marshal SAXE recognized shock action as the paramount function of cavalry, and declared that "cavalry that could not charge 2,000 paces at full speed without breaking, was unfit for service." His ideas, based upon his own experience and that of CHARLES XII. foreshadowed the brilliant use of cavalry soon to be seen on European battle-fields.

The Wars of Frederick the Great.—When FREDERICK THE GREAT ascended the throne of Prussia he found the cavalry trained to charge at a slow trot, and place its reliance on mounted fire action.

In his first battle, Mollwitz, the inefficiency of the cavalry was very manifest, and he resolved to make radical changes in the nature and use of that arm. As soon as the peace of Breslau gave him leisure for a careful overhauling of his army, he prohibited mounted fire action, and trained the cavalry to charge in good order at full speed, relying solely upon the shock. The greatest care was taken in the instruction of the recruits and the training of the horses, and the cavalry was brought to such a state of perfection that it is said that 8,000 or 10,000 horsemen could charge together, boot to boot, for many hundred yards, halt in perfect order, and immediately begin a new charge. FREDERICK also introduced the formation from column front into line, in place of the former method of changing direction and then wheeling into line.

FREDERICK'S cavalry consisted of cuirassiers, dragoons and hussars. The first had cuirasses and helmets; the others were without defensive armor. The cuirassiers and dragoons were formed into companies or troops of seventy men each, two troops forming a squadron, and five squadrons composing a regiment. Each hussar regiment consisted of ten squadrons, each numbering 144 sabers. The hussars were mainly relied upon for detached action, but they were also used in battle; all the cavalry being, in fact, used as circumstances demanded, for any duty that might properly be assigned to mounted troops. FREDERICK'S cavalry was at first formed in three ranks, but it was found that in two ranks the maneuvers were more precise and rapid, and the third rank was accordingly discontinued.

The cavalry was habitally formed in three lines; the first composed of cuirassiers, with intervals of only ten paces between squadrons, and the second composed of dragoons, with intervals of sixty paces between squadrons, through which the first line could retire in case it was repulsed. The hussars, generally in platoon columns, formed a third, or reserve, line, which was especially entrusted with the protection of the flanks. The cavalry, in masses of from twenty to sixty squadrons, was formed on the flanks of the army, and its own outward flank was generally protected by a hussar regiment in double column of squadrons. Three or four squadrons of dragoons were generally advanced about 150 paces ahead of the second line, in such a position that they could at once take in flank any reserve of the opposing cavalry that might fall upon the flank of the first line. This may be regarded as the normal formation, though it was often altered to a greater or less degree to suit the circumstances of the action. It was finally changed, so that the second line, instead of being directly behind the first, projected beyond one or both

flanks, and the third line similarly projected beyond the flanks of the second. The flanks being thus guarded, the hussar regiment was no longer employed as a special guard for the outer flank.

In attacking, the lines moved forward simultaneously, beginning at a walk, then passing to the trot, and covering the last 200 yards at a run. The men charged with a yell, to heighten the moral effect. As soon as the opposing force was broken, the pursuit was taken up, and no respite was allowed the defeated enemy until he was driven completely from the field. In case it became necessary to re-form the disordered lines, the cavalry always rallied to the front instead of to the rear. FREDERICK's cavalry leaders were instructed always to seize the initiative, and forestall any attack of the enemy.

Although the cavalry was forbidden to fire in action, the use of mounted firing was permitted in the pursuit, and the troopers were carefully trained in the use of fire-arms, in order that they might be able to meet the exigencies of detached action. The dragoons were able to fight well on foot, though that kind of fighting was never adopted when shock action was possible. The day after the battle of Rossbach the Prussian dragoons, finding the rear guard of the enemy posted in a chateau and enclosed gardens, dismounted, and attacking on foot, drove the French from their cover.

To compensate for the loss of fire action on its part, and not leave it exposed helplessly to the fire of the opposing infantry and artillery before coming within saber-reach, FREDERICK invented horse artillery, consisting of light guns, attached to the cavalry, which were used to pave the way for the charge, and to continue firing until masked by the cavalry.

When FREDERICK ascended the throne, the Prussian cavalry numbered 13,000 sabers, and its proportion to the infantry was about one-fifth; at the close of his reign the cavalry numbered 30,000 sabers, and was equal to one-fourth of the numerical strength of the infantry. No other general of ancient or modern times understood so well as FREDERICK how to make a decisive use of cavalry on the field of battle, and no other commander ever had such a perfect cavalry fighting force, or such able cavalry leaders; the name of SEIDLITZ or ZIETHEN being a synonym for all that a cavalry general should be. The victories of Prague and Leuthen were due, in a great measure, to the judicious and energetic use of cavalry; and at Rossbach the Prussian cavalry, 4,000 strong, almost unaided, defeated the army of the Allies, which lost 3,000 killed and wounded, 5,000 prisoners and seventy guns. It is claimed* that out of twenty-

*NOLAN.

two pitched battles fought by FREDERICK, his cavalry played a decisive part in at least fifteen of them, and history seems to bear out the claim.

But, perfect as FREDERICK'S cavalry was on the field of battle, it was distinctly inferior to that of the Austrians in all the details of the service of security and information. The Austrian light cavalry, and especially the irregular cavalry, composed of Pandours and Croats, formed a perfect screen around their army, which they kept posted with regard to every movement of FREDERICK, while keeping the Prussian monarch completely in the dark with regard to the movements of his adversary. Unable to cope in action with FREDERICK'S horsemen, they were, nevertheless, able to elude them, and far surpassed them in everything pertaining to the strategic service of cavalry. FREDERICK'S convoys, messengers and mail-bags were captured; for nearly a month, on one occasion, he was shut out completely from the rest of the world, and his knowledge of passing events limited to his own camp; a force of 4,000 Austrian light cavalry made a raid and captured Berlin; and at Sohr and Hochkirch he was surprised by the enemy, and was saved from disaster only by his own military genius. FREDERICK'S cavalry, in its organization and tactics, forms a model for cavalry pure and simple on the battle-field, even at this day; that of his opponents equally furnishes a model for the strategic use of mounted troops.

The Napoleonic Era.—The cavalry of the French Republic, in 1793, consisted of twenty-nine regiments of heavy cavalry, two regiments of carbineers, and fifty-four regiments of light cavalry, aggregating about 66,000 sabers. The heavy cavalry was armed with pistol and straight sword, and the carbineers had, in addition to the same weapons, a carbine with bayonet. The light cavalry consisted of dragoons, *chasseurs à cheval*, and hussars, all provided with saber and pistol, and with either carbine or musketoon. Each regiment consisted of four squadrons, each composed of 200 troopers.

This force, sufficiently formidable if properly trained, organized and handled, was largely composed of ill-instructed recruits, was almost incapable of shock action, and was disseminated as divisional cavalry among the many small divisions composing the several French armies. HOCHE first formed the cavalry into divisions; and NAPOLEON, in his first Italian campaign, united his cavalry in a similar manner. At a later period, NAPOLEON formed brigades and divisions of cavalry, and finally combined the divisions in cavalry corps. In the Russian campaign, in 1812, a division of light cavalry was attached to each army corps (but none to the infantry divis-

ions), besides which there were four corps of reserve cavalry, under MURAT. This enormous force, aggregating 80,000 sabers, and constituting one-sixth of the entire army, consisted of cuirassiers, dragoons, lancers and *chasseurs à cheval*, all in a high state of efficiency, resulting from the experience of many campaigns.

In the dispositions preceding the battle, the light cavalry was generally placed in echelon behind the flanks of the corps to which it belonged; the reserve cavalry, in second line, usually in rear of the center; and the cavalry of the Guard, sometimes reinforced with a portion of the reserve cavalry, in the third line. During the battle, the positions of the several bodies of cavalry were changed as circumstances demanded. This disposition was very different from that of FREDERICK, who always placed his cavalry entirely upon the flanks. It is to be observed that NAPOLEON'S armies were generally much larger than those of FREDERICK, and that if the French cavalry had been placed on the flanks, it often could not have received the orders of the Emperor until the time for its decisive employment had passed. As a rule, the cavalry of NAPOLEON attacked in column of regiments or brigades deployed one behind another at a distance of fifty or sixty paces. MURAT habitually formed the reserve cavalry for attack with two regiments of cuirassiers in the first line, with an interval of about twelve paces; four regiments of dragoons or chasseurs in second line, about 200 paces in rear of the first, three regiments being in line, with intervals of about eighteen paces, and half of the fourth, in column of squadrons, being behind each flank. The lines advanced simultaneously. In case of the repulse of the first line, the center regiment of the second line ployed its center squadrons in rear of its flanks and allowed the first line to pass through, immediately reforming and continuing the attack, the cuirassiers re-forming as a second line. The four squadrons in rear of the flanks of the second line were employed in the pursuit of the enemy.

In the battle of Eckmühl, April 22, 1809, the reserve cavalry was formed with sixteen squadrons of Würtemberg and twelve of Bavarian cavalry in the first line, each body formed in column of deployed regiments. At 400 paces distance was the second line, composed of two divisions of French cuirassiers under NANSOUTY and ST. SULPICE, each in the same formation as the cavalry of the first line. Just before collision with the Austrian cavalry, the Bavarians and Würtembergers moved towards the flanks and advanced abreast of the cuirassiers, the attack being thus made in a single line of columns of deployed regiments, consisting of sixty-eight squadrons.

Master of everything pertaining to the art of war, NAPOLEON made the most perfect use of his cavalry. In delivering a decisive shock on the field of battle, and in the relentless and unflagging pursuit of a beaten enemy, his cavalry rivaled that of FREDERICK; while in screening and reconnoitering duty it went everywhere and learned everything. The Emperor used cavalry successfully against the enemy's cavalry, infantry and artillery, and combined its use with that of the other arms in the most harmonious manner. The artillery prepared the way by its fire, the infantry bore the brunt of the combat, and heavy forces of cavalry were held in readiness to make charges at decisive moments. The formation of the French left at Austerlitz illustrates the perfect manner in which the three arms were combined. The infantry of LANNES' corps was drawn up in two lines, the first deployed and the second in line of battalions in close column by division, from which battalion squares could be readily formed. The divisional artillery was in the intervals between brigades, and a battery of position consisting of eighteen heavy guns was on the hill, known as the Santon, on which the left rested. The light cavalry belonging to the corps was on the left wing, echeloned slightly to the front. The reserve cavalry, under MURAT, was drawn up behind LANNES' corps, each cavalry division being in two lines of regiments in column of squadrons, one division being held in reserve. In the course of the battle the first line was broken by LICHTENSTEIN'S cavalry, which penetrated through the intervals of the second, when it was struck by the reserve cavalry and driven back. Between the fire of the battalion squares, which it received in passing both in attack and retreat, and the shock and pursuit of the reserve cavalry, LICHTENSTEIN'S force lost half its numbers and was eliminated as a factor in the battle.

The uses made of the cavalry on the field of battle by NAPOLEON were many and great. At Marengo a charge by KELLERMAN'S cavalry checked the victorious Austrian infantry, and, in conjunction with the attack of DESAIX, turned defeat into victory; at Austerlitz the success on the French left was mainly due to the cavalry; at Eylau a charge by MURAT upon the flank of the Russians, who had overthrown AUGEREAU'S corps, saved the day; at Wagram MACDONALD'S column, having suffered great losses, and being compelled to halt by a heavy attack of the Austrians in front and on the flank, was relieved by a vigorous charge of NANSOUTY'S cavalry, and resumed its advance; at the pass of Somosierra, the Polish lancers, charging over difficult ground, captured the batteries of the Spaniards and put their entire army to flight; at Borodino the great re-

doubt was captured by a charge of the cuirassiers; and at Dresden the victory was decided in NAPOLEON'S favor by a brilliant charge by MURAT, which overwhelmed the Austrian left, and resulted in the capture of 10,000 prisoners. The charges of NAPOLEON'S masses of cavalry have been likened to avalanches throwing down and sweeping away everything in their path, and they generally marked the decisive moment of the battle.

Notwithstanding the vigor with which NAPOLEON'S cavalry was used, and its great reliance on shock action, it was unable to charge at full speed after the manner of the cavalry of FREDERICK. The constant wars of NAPOLEON did not give an opportunity for the careful training in peace time that had made the Prussian cavalry so formidable in war; and, in order that the proper degree of cohesion might be maintained, the French cavalry charged at a trot or controlled canter. NAPOLEON restored the cuirass and helmet, which had fallen into disuse, and they have been retained in most armies until the present day.

Though in the use of cavalry NAPOLEON, like FREDERICK, placed his reliance upon shock, fire action was not altogether neglected. "I cannot," said the Emperor, "accustom myself to see 3,000 *élite* cavalry (cuirassiers) at the mercy, in the event of a surprise, of a few light troops, or liable to be checked on the march by a handful of poor marksmen posted behind trees and houses."* At Eylau an effective use of mounted fire action was made by the Twentieth *Chasseurs à Cheval* under peculiar circumstances. It is thus described by Captain PARQUIN: "Toward 2 P. M., an enormous mass of cavalry advanced on us at a walk, the snow and the boggy soil not permitting a faster gait. Colonel CASTEX asked if the carbines were loaded. Receiving an affirmative reply, he commanded 'Advance carbine!' and ordered the officers into the ranks. The enormous mass of dragoons kept advancing upon us at a walk, but our colonel remained undisturbed; and when the Russians were within six paces he commanded 'Fire!' The effect was terrible. Nearly the whole of the first rank of the Russians was placed *hors de combat*. There was a moment of hesitation on the part of the enemy; but soon the dead and wounded were replaced by the second rank and the *mêlée* became general. * * * The Twentieth Chasseurs lost more than a hundred men; the enemy [driven back] lost at least three hundred."†

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* Letter to the Minister of War in 1811.

† *Recits de Guerre, Souvenirs du Capitaine Denis Charles Parquin 20 ième regiment de Chasseurs à Cheval.*

In the great cavalry fight at Eckmühl, the cuirassiers of NANSOUTY and ST. SULPICE received the charging Austrian cavalry with a discharge of fire-arms, followed by an attack at the gallop.* There seems, however, to have been but a single volley, and the remainder of the *mêlée* consisted of a prolonged and desperate contest of steel against steel. The authenticated instances of mounted fire action by NAPOLEON'S cavalry were few, however, and it is evident that in the use of mounted troops he, like FREDERICK, depended almost exclusively on shock. For fire action the cavalry habitually depended upon the horse artillery, of which there were forty-eight batteries, aggregating 288 guns, or a little more than four guns to every 1,000 cavalry.

The invasion of Russia first brought into prominent notice a peculiar force of light cavalry, the Cossacks, which perhaps contributed more than any other troops to the overthrow of NAPOLEON. The Russian army also contained a great force of cuirassiers, dragoons, hussars and uhlans, but their influence on the final result of the campaign was as nothing compared with that of the clouds of irregular light cavalry furnished by the Cossack tribes. The Cossack cavalry was armed with the lance, sword and pistol; and extreme mobility and expert horsemanship were its chief characteristics. General MORAND describes the Cossacks as follows: "These natural horsemen are not organized in divisions; pay no attention to regular alignments and the order so highly prized by us; clasp their horses tightly between their knees; rest their feet in great stirrups, which serve as supports to them when using their weapons, so that they can bend their bodies forward to deliver a blow, or backward to avoid one. Trained to pass at once from the halt to the gallop, and from the gallop to a halt, their horses second their dexterity, and appear to be part of themselves. These men are always on the lookout, move with extreme rapidity, have but few wants, and warlike thoughts are the only ones that can arouse their interest."† Their tactics was peculiar, consisting of the *lava*,‡ or enveloping movement, made rapidly and in dispersed order, for the purpose of harassing the enemy, exhausting him, and forcing him to break his ranks, preparatory to charging him with the sword. In executing the *lava*, firing was generally employed. If charged by the enemy, the Cossacks, like the Sioux, gave way quickly, only to re-form promptly and renew the attack. In the campaigns of 1813–14 the

* THIERS.

† DE BRACK'S "Cavalry Outpost Duties," translated by CARR, page 328.

‡ This term is said to be from an old Tartar word, *laou*, signifying to work from a circumference toward a center.

Cossacks, arming themselves with infantry muskets, captured from the French, are said to have developed a system of fighting on foot somewhat similar to that employed a half century later by our own cavalry.

There are different accounts of the tactics of the Cossacks on the battle-field, and various estimates of their worth in action; but all accounts prove their inestimable value in everything pertaining to the service of security and information. DE BRACK (quoting DE LA VALETTE) says: "The Cossacks rendered military operations very dangerous, especially for the officers charged with the duty of making reconnaissances. Many of these, and especially the officers of the headquarters staff, selected by the commanding general, preferred to send in reports obtained from peasants to exposing themselves at a distance to the attacks of the Cossacks. Under such circumstances it was impossible for the emperor to keep himself properly informed in regard to the enemy."* General MORAND further says: "The march of the Grand Army was first delayed by the Cossacks, and later they cut it off from every source of supply, and swarmed around its flanks like savage bees engaged in tormenting and exhausting a roaring lion with their innumerable stings."† This irritating plague, elusive and omnipresent, made itself especially felt at a time when NAPOLEON'S own cavalry, depleted in numbers and exhausted by hardship, was less than one-fourteenth of the strength of his infantry. Never, indeed, had a commander greater cause to deplore his lack of cavalry than the Great Emperor, who understood its use so well. For want of cavalry to conduct a pursuit, his brilliant victories of Lützen and Bautzen were barren; and for days before the battle of Leipsic he was in the dark as to the movements of the Allies, while the latter were thoroughly informed in regard to his own. His military genius was paralyzed by lack of information, and to his deficiency in light cavalry, more than to any other cause, is to be attributed his downfall.

The Crimean and Italian Wars.—For nearly forty years after Waterloo, no important campaigns were conducted; and the first great war demonstrated the completeness with which the essential principles of tactics had been forgotten in the long peace. In the service of security and information the cavalry of both the Russians and the Allies was deficient to a lamentable degreee. In the flank march from the Alma to Balaklava, the head of the column, marching through a thick wood, was composed of the commanding general

* DE BRACK, translated by CARR, page 327.
† *Ibid*, page 328.

and staff, followed by thirty field guns in column of sections. "What this might have portended," says HAMLEY, "was presently made evident, for in an open space Lord RAGLAN came suddenly on a Russian column moving at right angles to his own force. * * * We had been absolutely unaware of this march of an army across our front till we stumbled on it; while MENSCHIKOFF remained in such complete ignorance that the Allied army was defiling within four or five miles of him, that even on the 28th [three days later] a messenger from him arrived in Sebastopol, part of whose errand was to get news of the movements and position of the enemy."* In this extraordinary march neither army was seen by the cavalry of the other.

Nor was the use of cavalry on the field any more intelligent than its use in reconnaissance. At Balaklava (the only battle of the entire war in which cavalry played any considerable part) a heavy force of Russian cavalry, advancing to attack the British Heavy Brigade, deliberately slackened its pace before contact, and received a counter charge at a halt. In this action the flank of the Russian cavalry was exposed to the Light Brigade, whose commander, Lord CARDIGAN, failed to avail himself of the opportunity thus presented, because his orders did not contemplate such action; but he afterwards engaged in a heroic, but senseless, charge on the Russian batteries, which furnishes a theme for poets, but not a model for a cavalry general.

In the Italian War of 1859, the use of cavalry was slight. This was largely due to the nature of the country, which was cut up with irrigating ditches and filled with mulberry groves and rice plantations. At Solferino there was a considerable combat between the French and Austrian cavalry; but the use of mounted troops in the campaign produced such unimportant results, that many military men argued that the day of cavalry had slipped entirely into the past; and at the close of the war Austria made a material reduction in her mounted force.

The War of Secession.—At the beginning of the war the cavalry of the United States army consisted of two regiments of dragoons, one of mounted rifles, and two of cavalry, aggregating about 4,000 men. Each regiment consisted of ten troops, having a war strength of 100 men. The arms of the dragoons were the saber, carbine and revolver; the mounted rifles were armed with the rifle and hunting knife; and the arms of the cavalry were similar to those of the

* "The War in the Crimea," page 76.

dragoons.* The designation of all the regiments was changed in 1861 to "cavalry;" and all were alike armed with the saber, revolver and carbine. This small force was augmented by a new regiment of cavalry belonging to the regular army, and by great levies of volunteers, until the cavalry of the United States reached the enormous aggregate of 80,000 men—a mounted force equal in numbers to the cavalry of NAPOLEON at the height of his power. Each regiment was organized on the model of the regular regiments in service at the beginning of the war. In the Southern States large forces of cavalry were also organized; and in the course of the long war the tactical and strategical uses of cavalry were such as to revolutionize the tactics of that arm.

To avoid the confusion into which European critics of our cavalry methods have generally fallen, the cavalry in the War of Secession should be divided for description into *regular* cavalry and *partisan* cavalry; the first consisting of troops armed and trained as dragoons and forming a part of large armies; and the latter made up of mounted soldiers placing habitual or entire reliance on fire-arms, and used mostly in detached action, though often engaged as part of a larger army in battle.

Confederate Partisan Cavalry.—The best type of Confederate partisan cavalry is found in the forces commanded by JOHN MORGAN and N. B. FORREST, two cavalry generals without previous military training or education, but endowed with natural soldierly capacity, which in the case of the latter amounted to military genius.

MORGAN'S force, at the height of its efficiency, consisted, nominally, of ten regiments of 500 men each; but, in reality, it never exceeded 4,000 men. The men were, at first, armed with a variety of rifles, muskets and shot-guns, but were finally uniformly provided with the Enfield muzzle-loading rifle, of a pattern between the infantry rifle and the carbine. Each trooper had a brace of Colt's "army revolvers," but the saber was practically an unknown weapon in the command. Two small howitzers, and at a later date, several light Parrot guns, were attached to the command.

MORGAN'S men habitually fought on foot, using tactics adapted from that in use in the "old army" for skirmishing, but extended so as to be applicable to regiments, or even brigades, as well as to

*It was prescribed in G. O. No. 15, A. G. O., August 15, 1855, that three squadrons of each cavalry regiment should be armed with the Springfield rifle-carbine; one squadron of each with the movable stock carbine, with the barrel ten or twelve inches long, as might be found best by experiment; one squadron of the First Cavalry with the breech-loading Merrill carbine; and one squadron of the Second Cavalry with the breech-loading Perry carbine.—*Price's "Across the Continent with the Fifth Cavalry," page 29.*

the small detachments for which it was originally devised. One-fourth of the men being detailed to hold the horses, the rest dismounted and deployed, in single rank, to the front, rear, or either flank, the intervals between the men being about two yards. In fighting on open ground the command was generally formed in two lines, the distance between them depending upon circumstances. The first line fired and lay down, and the second passing through the intervals some yards to the front, then fired and lay down, the lines thus passing each other in succession and keeping up a steady fire. In withdrawing, the lines passed each other in a similar manner. The general line was usually somewhat concave, the flanks extending slightly toward the front, the design being to bring a converging fire upon the enemy. The deployment was often covered by the flank companies as mounted skirmishers.

FORREST'S command at one time numbered about 6,000 men, and was divided into three divisions, each consisting of three brigades, each brigade composed of two regiments. The arms were practically the same as those of MORGAN'S command, with the addition of the saber, which was attached to the saddle, but does not seem to have been frequently used. Two light guns were attached to each brigade. FORREST'S tactics was similar to that of MORGAN, though he generally kept in hand a mounted reserve, which sometimes, as at Okolona, in February, 1864, fell with decisive effect upon the enemy's flank while the dismounted troopers engaged in front. At Guntown, Miss., in June, 1864, FORREST'S men, dismounted and posted behind cover, consisting of a low breastwork of logs and fallen timber, repulsed a well-conducted attack of Union infantry, by using rifle fire until the assailants were within close pistol range, and then opening fire with revolvers. This gave, practically, the same effect as fire from magazine rifles, twelve shots being rapidly delivered at close quarters. In the same battle, FOREST'S cavalry made a successful dismounted charge, which decided the contest, after which they mounted and followed in pursuit.

Both MORGAN'S and FORREST'S commands were used at times as component parts of large armies in battle. But their services were of greater value in independent operations, and especially in raids, which may be said to have had their first complete development in the War of Secession. Raids had, it is true, been made before. HADDICK had made a raid, in the Seven Years' War, in which he captured Berlin; in 1813 TCHERNICHEFF, with 3,000 Cossacks and four guns, had passed around NAPOLEON'S army and captured the City of Cassel; in the same year TETTENBORN, another Cossack

leader, had made a raid in which he captured Hamburg; and in 1831, DEMBINSKI, a Polish rebel leader, with a command of about 4,000 mounted men, made a successful raid from Kurszany to Warsaw, a distance of nearly 600 miles, in the course of which he eluded the Russians and captured considerable quantities of supplies. But in strategic results, in skillful execution, and far-reaching effects, the American raids surpassed all previous operations of the kind, and have as yet been unequaled.

MORGAN and FORREST each made a number of raids, in which they captured many prisoners and immense quantities of supplies, besides interfering so seriously with the communications of the Union army as almost to paralyze its advance. After the battle of Murfreesboro, or Stone's River, a forward movement by ROSECRANS was impossible until the Confederate cavalry could be checked in its devastating detached operations. The army was dependent mainly upon the Louisville & Nashville Railroad for its supplies; and owing to the persistent raids of the enemy, that road was operated only seven months and twelve days in 1862. The report of its superintendent for that year states: "All the bridges and trestleworks on the main stem and branches, with the exception of the bridge over Barren River and four small bridges, were destroyed and rebuilt during the year. Some of the structures were destroyed twice and some three times. In addition to this, most of the water stations, several depots, and a large number of cars were burnt, a number of engines badly damaged, and a tunnel in Tennessee nearly filled up for a distance of eight hundred feet."* The enemy's cavalry had steadily increased in numbers, efficiency and audacity, until it had become "a greater problem how to meet this arm of the enemy's force than his infantry."† MORGAN made his first raid with a force of about 900 men, traveling over a thousand miles in twenty-four days, taking possession of seventeen towns, destroying all the military supplies found in them, capturing nearly 1,200 Union soldiers, and dispersing 1,500 home-guards. He lost only ninety men and gained about 300 recruits on the raid.

When SHERMAN began his campaign in Georgia, in 1864, his communications from Louisville to Chattanooga, a distance of about 400 miles, were in danger of being intercepted, and his advance being brought to a standstill by destructive raids of Confederate cavalry. General SHERMAN says: "There was great danger, always in my mind, that FORREST would collect a heavy cavalry command in Miss-

*CIST'S "The Army of the Cumberland," p. 138.
† *Ibid.*

issippi, cross the Tennessee River, and break up our railroad below Nashville."* Two successive expeditions were accordingly sent against FORREST, the first being defeated with heavy loss at Guntown, and the second, consisting of two divisions, defeating him at Tupelo, and 'so stirring up matters in North Mississippi that he could not leave for Tennessee.' But FORREST was still a thorn in the flesh of SHERMAN, who, after the fall of Atlanta, sent NEWTON'S division back to Chattanooga, and CORSE'S division to Rome, and instructed ROUSSEAU at Nashville, GRANGER at Decatur, and STEADMAN at Chattanooga, to adopt the most active measures to protect the railroad communications from raids by FORREST and WHEELER.† Finally General GRANT urged SHERMAN to drive FORREST out of Middle Tennessee, as a preliminary to any other move.‡ In the whole range of military history it would be hard to find the name of another cavalry leader, who, with the same numbers, caused his enemies so much trouble as N. B. FORREST.

In Virginia, a force of mounted troops, under MOSBY, waged war in true guerilla style. They were armed in the same manner as MORGAN'S cavalry, but when not actively engaged, remained at their own homes, or billeted among sympathizers. When any operation against the convoys, or a raid upon the communications, of the United States armies was contemplated, the men were assembled at some designated rendezvous. The operation terminated, they again dispersed to their homes, and Union cavalry operating in the region infested by the guerillas could rarely find anything but apparently peaceable farmers. MOSBY'S men were, however, regularly enlisted, and constituted a part of the Confederate army under LEE.§ These enterprising partisans neutralized a large force of cavalry for the protection of the Union communications, and caused much loss and infinite annoyance to the Union commanders. In a report to General STUART, in September, 1863, MOSBY says: "The military value of the species of warfare I am waging is not to be measured by the number of prisoners and material of war captured from the enemy, but by the heavy details it compels him to make in order to guard his communications, and to that extent diminish his aggressive

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* "Memoirs," Vol. II., page 52.

† *Ibid*, page 30.

‡ *Ibid*, page 141.

§ MOSBY says: "All I did had the sanction of the commander of the Army of Northern Virginia, of which my own command — the Forty-third Battalion of Virginia Cavalry — was a part. I was independent simply in the sense that General LEE and General STUART had such confidence in me that they never undertook to trammel me with orders, but gave me full discretion to act as I chose."— *Mosby's "War Reminiscences," page 81.*

strength."* MOSBY'S guerillas each received, by way of reward, a portion of the plunder captured; as a punishment, offenders were transferred to the line of the Confederate army. MOSBY'S guerillas have often been confounded by ill-informed European critics with the regular Confederate cavalry, a mistake scarcely more justifiable than would be a confounding of the *Franc-tireurs* with the French dragoons.†

The essential characteristics of the Confederate partisan cavalry were extreme mobility, habitual and almost exclusive reliance upon fire-action, and the tactics of fighting dismounted, using horses only in marches and in pursuit. The saber was held in disrepute; but this is not remarkable, as the men had never had much or any training in its use, while they had all been accustomed to the use of fire-arms from youth. Great as were the deeds of the partisan troops in the War of Secession, the history of the *cavalry* in the same conflict shows that the latter could do all that lay in the power of the former and much more.

The Regular Cavalry.‡—In both the United States and the Confederate armies the cavalry was all light, and consisted entirely of dragoons.§ The Confederate cavalry being recruited from a population accustomed to horsemanship and the use of arms, reached a condition of efficiency much sooner than that of the Union army, to which it may be said to have furnished, in some degree, a model. It will, therefore, be considered first.

The Confederate Cavalry.—The cavalry of the Army of Northern Virginia may be taken as the finest type of the Confederate cavalry. During the greater portion of the war it was under the command of General J. E. B. STUART, an educated soldier of great merit, and a born cavalry commander. Ignoring the cavalry traditions of the Old World, and seeking only the most ready means to meet the ends in view, he originated a new method of using mounted troops, and may be said to be the father of the cavalry tactics of the present day.

At the beginning of the Gettysburg campaign, STUART'S cavalry, which was then at the height of its efficiency and numerical strength, consisted of six brigades, and aggregated about 10,000 men. The

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*SCOTT'S "Partisan Life With Mosby," page 392.

†The Franc-tireurs were irregular troops, resembling "home-guards."

‡In order to prevent misconception, it is repeated that under the caption "Regular Cavalry" is considered not merely the cavalry of the Regular Army, but all cavalry used as *cavalry* instead of mounted infantry.

§The Sixth Pennsylvania Cavalry was, at first, armed with the lance, and known as "RUSH'S Lancers." The lance was soon abandoned, however, and the saber and carbine were adopted in its stead.

personnel of the command was excellent, and it was well mounted, the troops furnishing their own horses. The men were generally armed with revolver and saber. One or two squadrons of each regiment were armed with breech-loading carbines, the rest being provided with Enfield rifles. The cavalry was trained to use the saber or to depend upon fire action, as circumstances might dictate; and the tactical versatility of the command was well illustrated in the combat of Poolesville, Md., of which General STUART reports: "Guarding well my flanks and rear, I pushed boldly forward, meeting the head of the enemy's column going towards Poolesville. I ordered the charge, which was responded to in handsome style by the advance squadron (IRVING'S) of LEE'S brigade, which drove back the enemy's cavalry upon the column of infantry advancing to occupy the crest from which the cavalry were driven. Quick as thought, LEE'S sharpshooters sprang to the ground, and engaging the infantry skirmishers, held them in check till the artillery in advance came up, which, under the gallant PELHAM, drove back the enemy's force upon the batteries beyond the Monocacy."*

More formidable in battle than the troops of MORGAN or FORREST, the cavalry of STUART rivaled them in detached action. STUART made a number of successful raids (on three occasions passing entirely around the Union army), in which he captured great quantities of stores, destroyed valuable public property, gained important information, and created consternation among his enemies. So well did his cavalry perform the duties of outpost and reconnaissance, that it is said that a force of but little more than 300 of his men at one time watched efficiently more than fifty miles of front, and reported every important movement of the United States forces.†

The United States Cavalry.—During the first two years of the war, the cavalry of the Army of the Potomac performed but little valuable service. Unappreciated by the first commander of that army, and frittered away in innumerable detachments, it was, as a body, deficient in instruction, wanting in *esprit de corps*, and lacking in the self-confidence so indispensable for cavalry. Finally assembled into a corps by HOOKER, its improvement was rapid; it profited by the lessons of its enterprising opponent; rose to an equality with its antagonist; and finally demonstrated its superiority over the foe to which, at the outset, it had been so distinctly inferior.

The battle of Beverly Ford, Va. (June 9, 1863), was the first

*Official Records of the Union and Confederate Armies, Series I., Vol. XIX., Part II., page 53.

† MCCLELLAN'S "Campaigns of Stuart's Cavalry," page 32.

engagement in which the United States cavalry manifested real efficiency; and this action, more than any other, illustrates the many-sided nature of the American cavalry. In this battle, a cavalry charge was repulsed by cavalry mounted; an attack by cavalry dismounted against cavalry dismounted and behind cover, was repulsed by sharpshooters in front, aided by mounted charges on the flanks of the assailants; a mounted charge with saber against dismounted cavalry using fire action and supported by a mounted detachment, was successfully made; and two opposing brigades of cavalry met in direct charge with the saber. In brief, every possible condition of cavalry action seems to have been encountered in this remarkable engagement.

As the United States cavalry improved, more and more reliance was placed by it on the saber, which was regarded as its first weapon, though the effective use of the carbine was sedulously cultivated. At the battle of Winchester, Va. (September 19, 1864), the Union cavalry made charges on foot or mounted, according to the nature of the terrain; and, finally, MERRITT'S division made the finest cavalry charge of the war, first striking EARLY'S infantry on the flank, and then squarely in the face as it changed front to meet the attack. The charge was first made by DEVIN'S brigade, which returned to rally, the charge being continued by LOWELL'S brigade, which rallied similarly, and the entire division (three brigades) then charging in a body, simultaneously with an advance of the infantry in front. The last charge completely routed the Confederate infantry, the first cavalry division capturing in the three charges 775 prisoners, seventy officers, seven battle flags and two guns. In the rest of SHERIDAN'S "valley campaign," the superiority of the Union cavalry over its adversary in tactical handling and general efficiency was manifest, and was mainly due to its equal expertness in the use of carbine or saber. In his report of the battle of Tom's Brook (October 9, 1864), General EARLY says: "This is very distressing to me, and GOD knows I have done all in my power to avert the disasters which have befallen this command; but the fact is, the enemy's cavalry is so much superior to ours, both in numbers and equipments, and the country is so favorable to the operations of cavalry, that it is impossible for ours to compete with his. LOMAX'S cavalry is armed entirely with rifles and has no sabers, and the consequence is they cannot fight on horseback, and in this open country they cannot successfully fight on foot against large bodies of cavalry." "This," says General MERRITT, "is a statement on which those who think our cavalry never fought mounted and with the saber should ponder.

The cavalry had scant justice done it in reports sent from the battle-field; and current history, which is so much made up of first reports and first impressions, has not to a proper extent been impressed with this record."*

The battle of Winchester demonstrated the efficiency of the United States cavalry in using the saber; the battles of Dinwiddie Court House and Five Forks, in the following spring, illustrated equally its effectiveness when using the carbine. In the first of these battles (March 31, 1865) the Union cavalry dismounted, and fighting behind such cover as it could find, held in check a superior force of Confederate infantry; and in the second (fought on the next day) it made a front attack, dismounted, upon the enemy, while the Fifth Corps attacked his left flank. In this action the dismounted cavalry carried earthworks manned by Confederate infantry. In the subsequent pursuit of LEE, the mobility and effective fire action of the cavalry were brilliantly displayed. Pressing rapidly ahead, SHERIDAN attacked the flank of EWELL'S corps, consisting of 6,000 men, and constituting the rear guard of LEE'S army. Holding the enemy with the fire of one division, he pushed the others ahead, moving them behind his own line, until he had planted MERRITT'S entire cavalry corps directly across the enemy's line of retreat. Holding EWELL in check with the cavalry, SHERIDAN hastened forward the Sixth Corps, and thus placing the Confederate rear guard between two fires, compelled its surrender. The following remarks of Sir HENRY HAVELOCK on this action, though made more than a quarter of a century ago,† constitute, perhaps, the best criticism that has ever been made upon it: "The mode in which SHERIDAN, from the special arming and training of his cavalry, was able to deal with this rear guard, first to overtake it in retreat, then to pass completely *beyond* it, to turn, face it, and take up at leisure a position strong enough to enable him to detain it in spite of its naturally fierce and determined efforts to break through, is highly characteristic of the self-reliant, all-sufficing efficiency to which at this time the Northern horsemen had been brought. The practical experience of nearly four years of continual war, the entire and untrammeled confidence placed in good men amongst the Northern leaders, when they proved themselves to be so, and the complete freedom left them of devising and executing the improvements their daily experience suggested, had enabled SHERIDAN, and one or two more of similar bent of mind, to shake themselves free of the unsound

*"Battles and Leaders of the Civil War," Vol. IV., page 514.
†In "Three Main Military Questions of the Day," London, 1867, page 97.

traditions of European cavalry theory, and to make their own horse not the jingling, brilliant, costly, but almost helpless unreality it is with us, but a force that was able, on all grounds, in all circumstances, to act freely and efficiently, without any support from infantry. Not only is there no European cavalry with which the writer is acquainted that could have acted the part now played by the force under SHERIDAN, but there is not on record, that he is aware of, an instance in the eventful wars of the last or the present century in Europe of a strong rear guard having been thus effectually dealt with."

In a similar manner, SHERIDAN outstripped and headed LEE's entire army, bringing it to bay until the main body of the Army of the Potomac came up, when, resistance being hopeless, LEE surrendered.

The nature and tactics of the United States cavalry in the West were essentially the same as those of SHERIDAN's cavalry. It is said of MINTY's cavalry brigade, in the Army of the Cumberland, which may be taken as a type of the mounted troops of the Western armies, that "it made five successful saber charges against superior numbers of infantry; four successful saber charges against artillery, in battery, supported by infantry and cavalry, resulting in the capture of guns; and over one hundred saber charges against the enemy's cavalry. It made twenty-five charges dismounted, and captured three strongly fortified and entrenched positions, when fully manned and defended by infantry and artillery."* At Nashville, the dismounted cavalry under WILSON, fought so successfully against the Confederate infantry, that HOOD, in anxiety and alarm, sent a message to CHALMERS, saying, "For GOD's sake drive the Yankee cavalry from our left and rear or all is lost."† The Union cavalry was not driven back, and the battle resulted in HOOD's complete defeat. It should be observed that in this battle the Union cavalry was armed with the breech-loading carbine and its opponents with the muzzle-loading rifle.‡ As soon as the victory was gained, the cavalry mounted and pursued the retreating enemy.

Long before the close of the war, the United States cavalry had developed a degree of efficiency in detached action that placed it on

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* VALE's "History of Minty and the Cavalry," page 5.

† "Battles and Leaders of the Civil War," Vol. IV., page 469.

‡ Before the close of the war, nearly all the Union cavalry regiments were armed with breech-loading carbines. In the early part of the war they were often very poorly armed. The Fourth Iowa Cavalry, for instance, was at first armed with sabers, Austrian rifles, muzzle-loading holster pistols, and a revolver of a very defective pattern. It received breech-loading carbines in the spring of 1863. In the Army of the Potomac the issue of carbines was made nearly a year earlier. (See SCOTT's "History of the Fourth Iowa Cavalry," and PRESTON's "History of the Tenth Cavalry, New York State Volunteers.")

a level with its adversaries, if it did not surpass them. In screening and reconnoitering duty, and in all the details of the service of security and information, it furnishes, as yet, the best model for the military student;* and, in raiding, its achievements have never been surpassed. It is not the purpose here to give a narrative of the raids made by the Union cavalry. It will suffice to give a brief sketch of the raids of GRIERSON and WILSON, which may be taken as a type of those made by the mounted troops of the United States. In 1863, GRIERSON, with a brigade of cavalry, numbering about 1,700 men, left LaGrange, Tenn., on April 17th, and reached Baton Rouge, La., on the 2d of the following month, having marched more than 300 miles through hostile country, passing in rear of the Confederate army, destroying the railroad at several points, and burning considerable quantities of supplies. General GRANT states that this raid was of great importance in attracting the attention of the enemy from the main movement against Vicksburg.†

In point of numbers engaged and the amount of destruction wrought, the greatest raid of the war was that made by General J. H. WILSON, in the spring of 1865. WILSON'S command, numbering about 13,000 cavalry and eighteen guns, left Chickasaw, Ala., on the 22d of March. Each trooper was armed with a Spencer magazine carbine, and was provided with five days' rations, twenty-four pounds of grain, a pair of extra horse-shoes, and 100 rounds of cartridges. A train of 250 wagons, carrying supplies, accompanied the command, which was also provided with a ponton train. The line of march lay through Elyton, Montevallo, Selma, and Montgomery, Ala., and West Point, Columbus, and Macon, Ga., terminating at the last-named point on the 20th of April. The command (notwithstanding its being accompanied by a train) had lived entirely upon the country; had marched 525 miles in twenty-eight days; had defeated FORREST at Plantersville and Selma, the Confederate works at the latter place being carried by the Union cavalry in an assault on foot; had captured 6,820 prisoners and 280 guns; and had destroyed a gun-boat, an armored ram ready for sea, 99,000 stands of small arms, 1,000,000 rounds of artillery ammunition, 235,000 bales of cotton, 20 locomotives, 250 cars, and all the mills, iron works, factories, railroad bridges, and military establishments, found on the line of march. At Macon, WILSON learned of the armistice between SHERMAN and JOHNSTON, the fall of Richmond, and the dis-

*See the chapters on "Reconnaissance" and "The Cavalry Screen," in *The Service of Security and Information.*

†"Memoirs," Vol. I., page 489.

persion of the Confederate government. Distributing his troops along the line of the Ocmulgee and Altamaha Rivers, he fitly terminated his remarkable expedition by the capture of the fugitive President of the Confederacy.

Mounted Infantry.—To protect his communications from the enemy's raids, ROSECRANS, not having a sufficient force of cavalry, organized a brigade of mounted infantry, which was placed under the command of Colonel John T. WILDER, an enterprising and meritorious officer. Five regiments of infantry composed the brigade, to which a light battery was attached. The command was at first mounted on horses or mules impressed in the country, and was armed with the Spencer magazine rifle, using metallic cartridges. It soon reached a high state of efficiency, as mounted infantry pure and simple, the horses being used merely as a means of locomotion, and all the fighting being on foot. At the battle of Hoover's Gap (June 24, 1863), it repulsed with great slaughter a determined attack made by a division of Confederate infantry; and, owing to its mobility and its superior arms, it constituted a formidable force both in detached action and in the line of battle. But, though this force was the most perfect body of mounted infantry used in the War of Secession, it did nothing that the cavalry did not do equally well, while the decisive mounted charges of the latter in the Shenandoah Valley would have been impossible with even such exceptionally good mounted infantry as WILDER's brigade.

The Austro-Prussian War.—In 1866, the Prusians had in the field a force of 30,000 cavalry, consisting of cuirassiers, armed with saber and pistol; Uhlans, armed with saber, pistol and lance; and dragoons and hussars, both armed with sword and carbine. Each regiment consisted of four squadrons,* each 150 sabers strong. Two (and in some cases three) regiments formed a brigade, and three brigades a division. The Austrian cavalry aggregated about 27,000 sabers, and was similar in its composition, arms, equipment and organization to the cavalry to which it was opposed.

The results accomplished by the cavalry in this short but momentous war were insignificant. The reconnaissance duty on both sides was performed so negligently that on the day before the battle of Königgrätz, the outposts of the two opposing armies faced each other within a distance of four and one-half miles, without either army suspecting the near and concentrated presence of the other one.† After each battle the pursuit by the cavalry was ex-

* Each regiment had, in addition to its four field squadrons, a depôt squadron.

† "Prussian Official History," (translated by WRIGHT and HOZIER), page 161.

ceedingly feeble, and after the battle of Königgrätz the Prussians lost all touch with the Austrian army, and for three days were completely in the dark in regard to its movements. There was, moreover, no attempt to execute raids, although excellent opportunities were offered the Austrians to paralyze the advance of the Prussians upon Vienna by operating against their communications. In everything pertaining to the detached action of mounted troops, the Austrian and Prussian cavalry in this war were, in fact, pitifully impotent.

On the battle-field, the cavalry was used with vigor and gallantry; but its action taught nothing new. At Nachod, the Prussian cavalry was used with energy to cover the passage of the main army through the defile, but its lack of firing power limited it to the tactical offensive, and it suffered heavy loss. At Königgrätz, the Austrian cavalry displayed admirable courage in covering the retreat of the infantry, and several great cavalry actions occurred, which were stubbornly contested, and with varying success, though resulting generally in favor of the Austrians, when the Prussian cavalry alone was encountered. In these cavalry combats, steel alone was used; and in the tactical formations employed and the weapons used, they differed in no appreciable degree from the cavalry battles of a century before.

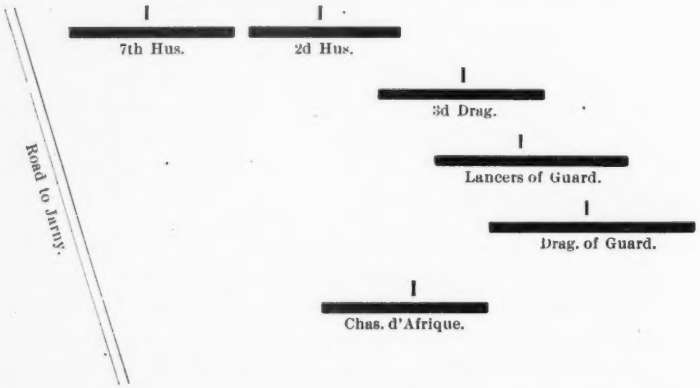
The Franco-German War.—When the Germans entered France, in 1870, the cavalry of the invading armies consisted of 336 squadrons, aggregating a little more than 50,000 sabers. In composition, organization and arms it was the same as in the Austro-Prussian War. The cavalry of the French armies aggregated 40,000 sabers, and consisted of cuirassiers, carbineers, dragoons, lancers, chasseurs, hussars, chasseurs d'Afrique and Spahis. The chasseurs d'Afrique were troops designed originally for service in Algeria. They were mounted on Arab horses, and may be classed as light dragoons. The Spahis were light cavalry composed of native Algerians, officered by Frenchmen, except in the subaltern grades. The cuirassiers and carbineers (twelve regiments) were classed as heavy or reserve cavalry; the lancers and dragoons (twenty-two regiments), as cavalry of the line; and the rest (twenty-nine regiments), as light cavalry. Each regiment had four squadrons in the field, besides which the light and part of the heavy cavalry had two depôt squadrons to each regiment; the other regiments had one depôt squadron each. The squadrons averaged 125 sabers. The formation of brigades and divisions was similar to that of corresponding units in the German army.

The inefficiency of the Prussian cavalry in 1866 had been taken to heart by its own officers, and in the interval between the two wars with Austria and France, the instruction of the Prussian horsemen had continually held in view a more vigorous and enterprising action in the field. The result was visible at the opening of the campaign in France, the German cavalry being used in detached action with a vigor that astonished and disconcerted its opponents. The German cavalry "overflowed the country miles, and even several marches ahead of the main body of the infantry," scouting vigilantly, reporting every movement of the enemy, and screening its own army from him with a veil of horsemen. In this duty the vigilant Germans found an opponent deficient in enterprise, and bewildered by a method of cavalry employment which, in the French army, had become a lost art. So negligently did the French cavalry perform the duty of security and information that FORTON'S cavalry division was surprised in its own camp at Vionville; and at Beaumont there was a remarkable surprise which can best be described in the words of BORBSTAEDT:* "In the most inexcusable way, nothing whatever was done on the part of the cavalry to reconnoiter the wooded country south of Beaumont, in order to ascertain with certainty whether the supposition of the enemy being on his march to Stenay was founded in fact or not. * * * The French troops in the open encampment south of Beaumont were enjoying their ease, and incredible as it may seem, had not the remotest idea of the storm that was on the point of bursting over them. The men were employed in cooking, and a good many of the horses had been taken to water. Thus it happened that the Seventh and Eighth Infantry Divisions, on debouching from the woods, threw themselves without further hesitation on the camp, which was only about 3,000 paces distant, and completely surprised the enemy's troops. The Prussian and Saxon shells falling in the midst of the camp was what, all of a sudden, alarmed the French, everyone rushing to take up his arms; but Prussian infantry had meanwhile reached the camp and put to flight the isolated bodies of troops that formed themselves. The French artillery had no time to harness their horses and put them to the guns, which were consequently abandoned. All the tents, the entire baggage and considerable camp stores fell into the hands of the victors, and the remnants of the French division sought safety in most disorderly flight through Beaumont up to the heights north of the town, where the remaining three brigades of the corps had been encamped."

*BORBSTAEDT'S "History of the Franco-German War," (translated by DWYER) page 549-50.

In brief, the German cavalry was ubiquitous and reported every movement of the French, while the latter were generally ignorant of the movements and designs of their adversary.

On the field of battle both the French and the German cavalry were used with energy and great gallantry; but the desperate cavalry charges, in almost every instance, resulted solely in appalling losses on the part of the assailants. At Wörth (August 6, 1870) MICHEL'S cuirassiers and part of NANSOUTY'S lancers charged upon the infantry of the German XI. Corps, and were almost annihilated by rifle fire. Later in the day BONNEMAIN'S division of heavy cavalry attacked the same corps, making the charge through hop-gardens and over other impracticable ground, and was repulsed with destructive losses. At Mars-là-Tour (August 16, 1870) a number of charges were made by the cavalry of both armies, the battle furnishing instances of the action of cavalry against cavalry, and cavalry against infantry. The greatest cavalry action of the day was between the German cavalry division of General VON BARBY and the French cavalry division of General LEGRAND, six regiments in each. The French division was formed as follows: In the first line were two regiments of hussars; in second line a regiment of dragoons was echeloned to the right of the first; in third line a regiment of lancers covered a part of the second line, and extended beyond its right; a regiment of dragoons was similarly formed in fourth line; and in fifth line a regiment of *chasseurs d'Afrique* was echeloned behind the left flank of the fourth. (*See figure below.*)



The formation of BARBY'S division was quite similar, the left flank being protected by echelons to the rear. The two divisions

coming together, there was a series of shocks, and of flank attacks by successive echelons on either side, until the two divisions were commingled in a confused mass of struggling horsemen, plying the saber and lance with deadly effect in the *mêlée*. The French were finally crowded back, and their leader sounded the recall. The retreating French were pursued by some squadrons of the German cavalry until the latter came under the fire of infantry and dismounted *chasseurs d'Afrique*, when they retired and rejoined the main body of the cavalry division, which had been assembled by BARBY, on the ground where the collision had occurred.

In only one of the many cavalry combats in the battle of Mars-là-Tour was anything really accomplished. In this case, a headlong charge by General VON BREDOW, with six squadrons, composed equally of cuirassiers and Uhlans, upon the French infantry, checked the advance of the French Sixth Corps, and gained time for the arrival of the German infantry, so sorely needed on that part of the field.*

At Sedan, a desperate charge was made upon the Prussian infantry by a great body of French cavalry, consisting of the heavy divisions of MARGUERITTE and BONNEMAIN, and several regiments detached from army corps. This was the greatest cavalry-infantry combat of the war. Nothing in the existing circumstances justified the charge, except, perhaps, the desperate position of the French army; for the Prussian infantry, on which the attack fell, was strong in numbers (seventeen battalions), unshaken by infantry or artillery fire, well supplied with ammunition, and possessed of the confidence resulting from a succession of great victories. The charge is thus described by General SHERIDAN, who was an eye witness:

"Presently, up out of the little valley where Floing is located, came the Germans, deploying just on the rim of the plateau a very heavy skirmish line, supported by a line of battle at close distance. When these skirmishers appeared, the French infantry had withdrawn within its entrenched lines, but a strong body of their cavalry, already formed in a depression to the right of the Floing road, now rode at the Germans in gallant style, going clear through the dispersed skirmishers to the main line of battle. Here the slaughter of the French was awful, for in addition to the deadly volleys from the solid battalions of their enemies, the skirmishers, who had rallied in knots at advantageous places, were now delivering a severe and effective fire. The gallant horsemen, therefore, had to retire precipitately, but re-forming in a depression, they again undertook the hopeless task of breaking the German infantry, making in all

* For a description of this famous charge, see the chapter on "Cavalry Tactics."

four successive charges. Their ardor and pluck were of no avail, however, for the Germans, growing stronger every minute by the accession of troops from Floing, met the fourth attack in such large force that, even before coming in contact with their adversaries, the French broke and retreated to the protection of the entrenchments, where, from the beginning of the combat, had been lying plenty of idle infantry, some of which at least, it seemed plain to me, ought to have been thrown into the fight."*

After Sedan, the war produced no cavalry action of importance. All the engagements thus far considered were, on the part of the cavalry, combats with sword and lance alone. Dismounted fire action was effectively used by the French at Spicheren, where the necessity of sending reinforcements to the front left only two squadrons of dragoons and a company of sappers to hold the village of Forbach. On the approach of the advance guard of the Prussian Thirteenth Division, the dragoons opened fire, and for some time held the enemy in check. Finally, when both of their flanks had been turned, the dragoons remounted, charged the enemy, and retired to another position in rear. On the 31st of August, a squadron of CLÉREMBAULT'S cavalry division dismounted and held the enemy's infantry in check with its fire until the division was rejoined by its own infantry, from which it had been separated. On the same occasion a regiment of dragoons dismounted and drove the enemy out of the village of Coincy, which they held until relieved by their own infantry. At Pont-à-Mousson (August 15th), a squadron of Prussian hussars, using the carbine, skirmished successfully with a detachment of French infantry, which they drove out of the village, thus opening a passage for the cavalry. But the use of fire action was very slight. BORBSTAEDT says that the French cavalry received BARBY'S charge with a volley from their carbines; and BONIE says that in the same engagement the German dragoons fired upon the advancing French cavalry; but both statements have been denied.

The inability of the German cavalry to use fire-arms effectively led it, more than once, into an embarrassing position. The day after the battle of Weissenburg, two cavalry regiments, conducting a reconnaissance towards Hagenau, were stopped by a small party of French infantry at a broken bridge and compelled to retire; and in the winter campaign on the Loire the conditions were to the German cavalry mortifying in the extreme. The country was filled with *Franc tireurs*, who boldly stated that they had 'come out to hunt Prussians,' and the Uhlans, with their lances and sabers, were

*SHERIDAN'S "Memoirs," Vol. II., page 401.

obliged either to avoid every village and wood occupied by these undisciplined and untrained bands of men who could shoot, or else to bring infantry along for their own protection. Their mobility was thus reduced to a minimum, and it was only when the Uhlans armed themselves with rifles captured from the French that they again began to be of value to their army.*

Raiding seems not to have been thought of by either army in this great war, though the French might, it should seem, have made profitable use of this method of employing cavalry. BAZAINE allowed 15,000 cavalry to be shut up in Metz, where they were utterly useless, when he might, immediately after the battle of Gravelotte, have sent them out to destroy the railroad communications to the east of the Moselle, on which all three German armies depended, relying upon their making their way safely to Paris or the south of France. If successful, the results of the raid would have been momentous, at least checking for a time the progress of the German armies; if unsuccessful, the raid would have resulted in the capture of the cavalry, which eventually had to surrender in Metz without having done the enemy any damage whatsoever.

In organization, armament and tactics, the cavalry of the Franco-German War did not differ appreciably from that of the Napoleonic era. In the European cavalry service the art of war seems to have been at a standstill, and the cavalry constituted just such a force as HAMLEY must have had in mind when he stated that, although improvements in weapons had materially affected the actions of infantry and artillery, science had done nothing for cavalry.† It might have been expected that the large, carefully trained and thoroughly appointed force of cavalry in the German army would have produced results commensurate with its numbers and the cost of its maintenance; but it did not, and the French cavalry did vastly less. Not one battle was decided by the use of cavalry; only one charge (BREDOW'S) produced appreciable results; and while the detached action of the German cavalry was brilliantly performed in the earlier stages of the war, its success was mainly due to the incapacity of the opposing cavalry, and it failed as soon as it encountered bodies of partisans who could use the rifle. When we compare the enormous results wrought by the American cavalry in the War of Secession with the feeble service rendered by the German cavalry in France a few years later, it is impossible to avoid

*See essay on "Mounted Riflemen," by Captain J. R. LUMLEY, late Thirteenth Prussian Uhlans, in Ordnance Notes, No. 169.

†"Operations of War," page 362.

the conclusion that there was something radically wrong in the tactics and arms of European cavalry. The Germans were not slow to appreciate their defects and the causes of the same; and the following views of VON SCHMIDT, expressed soon after the close of the war, have been carefully considered in the reforms since made in the German cavalry service: "The experiences of the last campaign have proved irrefutably that it is indispensably necessary that cavalry should, to a certain extent, be able to fight on foot, if it would be prepared to fulfill all the tasks which, without demanding too much from it, will, in certain situations, fall to its lot in the field. Although during the last campaign, abnormal circumstances required that cavalry, in order to fulfill the task entrusted to it, should dismount and exchange the saber for the carbine more frequently, perhaps, than will hereafter be necessary, yet similar circumstances will arise in future wars and render the same mode of action necessary, especially when hostile cavalry divisions endeavor to prevent our screening and reconnoitering operations by occupying defiles and localities with dismounted men. If in such cases the cavalry had to call upon infantry, it would suicidally degrade itself to the rank of a secondary arm, and surrender the last vestige of its independence. However important the services that might in certain cases be rendered by battalions of infantry being attached to cavalry divisions, such a procedure would in the further course of operations be very prejudicial to the cavalry; the infantry would be like a leaden weight attached to its feet, destroying its mobility and rapidity of movement, in which the whole power of the arm resides."*

The Russo-Turkish War.—In the Russian campaign in Turkey, in 1877, the invading army, numbering about 200,000 combatants of all arms, contained 204 squadrons of cavalry, aggregating about 37,000 sabers. The cavalry was composed of dragoons, hussars, lancers and Cossacks, in about equal proportions. The dragoons were armed with the saber and musket with bayonet; the hussars and lancers, with the saber, lance and revolver for the front rank, and the saber, carbine and revolver for the rear rank; and the Cossacks, with lance, musket and curved sword. Each regiment consisted of four squadrons, and each cavalry division was composed of four regiments.

The Turkish cavalry numbered eighty-five squadrons of regular troops, armed with saber and Winchester rifle. In addition to these were considerable numbers of irregular cavalry, known as *Bashi-bozouks*, who are characterized by GREENE as "insubordinate and

*"Instructions for Cavalry," (translated by BELL) page 186.

unruly, occupied in marauding and pillaging instead of reconnoitering, cowardly and disobedient in battle, and of no military service whatever to the Turks."

The only cavalry operations, either on the field of battle or in the theater of war, worthy of note in this campaign, are found in GOURKO's first expedition across the Balkans. On the 30th of June, a few days after the Russian army had crossed the Danube, General GOURKO was directed to push south to Tirnova and Selvi, reconnoiter the surrounding country, and be prepared, on the receipt of orders, to seize a pass in the Balkan Mountains, for the passage of the main army. He was, at the same time, to send cavalry on a raid to the south of the mountains to destroy the railroads and telegraphs, and do such other damage as might be possible. The force under GOURKO's command consisted of 8,000 infantry, 4,000 cavalry and thirty-two guns.

"On the 19th of July, the Shipka pass was in the hands of the Russians, and the principal objects of GOURKO's expedition were accomplished. In eight days from the time of leaving Tirnova, and sixteen days from the Danube, he had gained possession of three passes (Hainkioi, Travna and Shipka), covering a length of thirty miles in the Balkans, and one of them the great high-road from Bulgaria to Roumelia; he had dispersed various Turkish detachments, numbering in all about 10,000 men, had captured eleven guns and a large quantity of ammunition, clothing and provisions, and had disarmed the Turkish population throughout a large part of the valley of the Tundja; and all with the loss of less than 500 men. His men and horses had lived off the country and what they captured from the Turks, and on the 19th they still had three days' rations of hard bread (out of the five they had taken with them) untouched."*

After resting a few days at Shipka, GOURKO sent raiding detachments southward, which destroyed a number of bridges and culverts, several railway stations, and some miles of railroad and telegraph line, besides gaining important information in regard to the location of the Turkish forces. Pushing forward some thirty miles from Shipka, GOURKO was finally pressed back by superior forces of Turks, 50,000 of whom he held in check for two days. His cavalry passed to the northern side of the Balkans, where it rested and refitted, the passes of Shipka and Tirnova being held by the infantry.

"This expedition of GOURKO," says GREENE, "was more than a mere cavalry raid; it was an admirably conducted movement of an

* GREENE'S "Russian Campaigns in Turkey," page 174.

advance guard composed of all arms. With 8,000 infantry, 4,000 cavalry and thirty-two guns, it had, in less than a month, gained possession of one of the principal passes of the Balkans, from which the Russians, though terribly attacked, never let go their hold, and which they finally used in January for the passage of a large portion of their army. It had carried a panic throughout the whole of Turkey between the Balkans and Constantinople; and its scouting parties had penetrated to within seventy miles of Adrianople, the second city of the Empire, and had destroyed the railroad and telegraph on the two principal lines; finally, it had gathered accurate information concerning the strength and positions of the large Turkish force advancing toward the Balkans. In this expedition alone of the whole campaign was the cavalry energetically handled. On several occasions it fought on foot; it was constantly on the move; it subsisted on the country; and on the 29th and 30th of July fourteen squadrons of it (1,800 men) held their own against 4,000 infantry and several hundred bashi-bozouks and Tcherkesses; and it finally covered GOURKO's retreat before a force more than three times superior to his own. The irregular cavalry of the Turks never waited long enough to come to hand-to-hand blows; on one occasion (July 16th), while fighting on foot against infantry, the dragoons advanced with fixed bayonets, but the Turks retired without accepting a hand-to-hand struggle."*

The Russo-Turkish War was the last one of sufficient magnitude to furnish any valuable illustrations of the use of cavalry. In the campaign in Egypt, in 1882, the British cavalry vigorously pursued the enemy after the battle of Tel-el-Kebir, and Sir DRURY LOWE gave a notable example of the energetic use of cavalry in pushing on to Cairo, more than fifty miles ahead of the infantry, and seizing the Egyptian capital within less than forty-eight hours after the battle. But the enemy was not possessed of sufficient energy or courage to test the skill or mettle of the British cavalry, and the campaign really teaches nothing new.

Conclusions.—In considering the use of cavalry in modern wars, we cannot fail to be impressed with the following manifest facts:

1. The most successful cavalry on the battle-field has always been that which possessed the power of giving the most effective shock; in other words, the one which united the greatest mobility with the highest power of cohesion and the most effective use of the saber in the *mêlée.*

2. Mounted fire action is often useful in pursuit, and exceptional

* *Ibid,* page 183.

circumstances have even made it useful, in some cases, before the charge; but cavalry depending upon such action instead of the shock has rarely accomplished important results on the field of battle, and never against good opposing cavalry relying upon the shock.

3. Extreme mobility is an essential characteristic of good cavalry. An army having only a good heavy cavalry, irresistible in battle, may nevertheless be ruined in the course of a campaign by an adversary possessing only a highly mobile and efficient light cavalry.

4. Cavalry unable to deliver effective dismounted fire action is essentially a dependent arm, unable to act on a tactical defensive, and easily checked by insignificant bodies of hostile infantry well posted in defensive positions. The use of cavalry in reconnaissance, in raids, in pursuit, and in holding defensive positions, requires that it should be armed with a good fire-arm and be expert in its use. In this way only can it act with independence and vigor.

5. The dragoon, being armed and trained to fight either on horseback or on foot, fulfills all the requirements of cavalry, both in battle and in detached action.

In the discussion of cavalry tactics in the following pages, it will be assumed, therefore, that the cavalry consists of men trained to place equal value on mounted action with the saber and dismounted action with the carbine; in other words, of dragoons.

MILITARY FOOD.

By Captain CHAS. E. WOODRUFF, Assistant Surgeon, U. S. Army.

AN army is a collection of disciplined, active, healthy men in the prime of life, to be used as a fighting force in the service of the nation, and it is the object of military administration to so govern and train these men that they shall not fail when fighters are needed. Everything is to be done which can reasonably be expected to increase their efficiency, and it is an actual fact that nearly every military law and regulation has for its ultimate effect the increased efficiency of the individual soldier as a fighter. Unless the man is kept in health, he is useless, and for this reason all subjects which relate to his health are given much thought. Clothing, food, shelter and exercise are the principal subjects for consideration, for if any of them are improper, there is sure to be a loss of efficiency, but it is probable that deficiencies of food or improper food will cause damage or disaster more quickly than anything else. For instance, most of the diseases of the War of 1812 were due to defective food, and in ninety per cent. of the cases the flour was at fault. In the War of the Rebellion similar reports were often received, and the tales of actual hunger that all veterans recount, are too numerous by far. It is evident, therefore, that the ration should be the subject of most careful thought, and all reasonable means be tried to adjust it to the exigencies of military life.

Armies have always been fed upon a purely practical basis. At first food that could be obtained in the occupied territory, was that which was generally supplied. The method of transporting food supplies with the armies, and the gradual evolution of methods of maintaining a base, and the means of transporting more supplies to the army in the field, are comparatively modern. Here, again, the question, as far as food supplies is concerned, was and is a purely practical one, which military men have solved in accordance with

their experiences. The kinds of foods which could be most easily obtained, preserved and transported were the only ones selected. If the soldier wanted anything else he had to forage for it.

Theoretical considerations never entered into the question at all. This is not surprising when we remember that the science of food is one of the most recent of modern advances in knowledge. Indeed, as it is in great part chemical in nature, it could not have been expected to arise until long after chemistry itself had become established as a recognized science. As the discovery of oxygen, something over a century ago, is usually given as the beginning of the science of chemistry, it is clear that it is not yet time to expect new sciences but recently growing out of chemistry to assume their proper places of importance. At the present time, that is in the last quarter of the nineteenth century, the science of food is just becoming to be recognized as assuming that exactness and definiteness which give value to what is called science. At this moment physiologists are piling up facts relative to the oxidation and other changes of food in its course through the body; physicians are recording immense amounts of knowledge relative to the diseased states brought about by improper food, and practical men are recording their experiences of the results of feeding large bodies of men on any particular diet.

It can therefore be taken for granted that now, and for a long time to come, the feeding of armies must be considered as essentially a practical problem which military men themselves must solve. The immature condition of the science in question, and its apparent contradictions at present, preclude the possibility of the physiologist stepping in and saying authoritatively, "The ration of the soldier must be thus and so."

Though this is acknowledged, it must be further granted that it has been by means of truly scientific observations on food and disease, that fatal errors in the ration have been corrected, even before any attempt was made to study the subject as a pure science. For instance, until the present century, it was the exception for a ship to make a long cruise without a terrible record of death from scurvy. The evil was so bad that at times a whole ship's company has been unfit for duty. The cause of this was recognized by physicians and reported upon for more than a hundred years before the proper steps were taken to prevent the appearance of the disease. At the present time, an outbreak of scurvy on a ship is evidence of criminal incompetence and perhaps of violation of law.

We are always fighting shy of innovations that upset our old

ideas, and we take an insane delight in ridiculing anything new. We are liable to make ourselves ridiculous *by resisting the introduction of new things of value*, like the military men of the fifteenth and sixteenth centuries, who objected to the introduction of muskets in armies, because they would destroy the military bearing of the soldiers. In other words, a blind adherence to practical experience is apt to generate an antagonism to appropriate innovations. Conservatism is too apt to take on the character of stupid obstruction, and the practical man who keeps one eye open to the hints of scientific observers, is apt to be in advance of his contemporaries, even though he make an occasional mistake.

The company commander has had much experience in the practical problems of feeding men, knows what the men like, knows of practical defects in the ration, and upon him devolves the duty of suggesting means of avoiding errors of the past. Perhaps some knowledge of the uses of food and the errors of particular kinds of diets may be of assistance in this duty. For the above reason, it is hoped that a synopsis of some points in this direction will not be considered foreign to a line officer's sphere of thought.

USES OF FOOD.

The word, food, as popularly used, refers only to such articles as bread, meat, etc., that we eat, but the word is here used, for a while at least, in its technical sense, as including everything taken into the body by any channel. It will be seen that the air we breathe is just as much a food as potatoes, for the oxygen of the former supplies half of the energy generated, by combining with the carbon and hydrogen of the latter.

It is not possible to understand the principles governing the selection of a ration, without some knowledge on the subject of food in general, though a complete exposition of the question would be entirely inappropriate here. This part of the subject can, therefore, be taken as a mere outline sketch.

Since the use of food has become known, it has been the habit of all writers to compare the human body to any other power-generating machine, and the steam engine is always the example used. Following the usual threadbare custom then, if we look at a locomotive we see a remarkable similarity in the uses of its supplies and the uses of a man's food. In the engine we have the fuel to supply by chemical combination the energy for the work to be done, and the heat for warmth of cab and cars; the water through which the

energy is transmitted; the oil for lubrication of sliding surfaces; the sand for the necessary friction on the track; the cotton waste for cleaning and other purposes; and various substances, like wire, nails, bolts, bits of steel and iron for repairs. Food for man has exactly the same uses as the above, though in some cases the analogy is apparently far-fetched. The great difference in the two cases is this, that while in the engine the substances are supplied ready for use, in man they are supplied in bulk and variously mixed together, and that by means of digestion and other processes they are sorted out, modified, and often changed into entirely different forms before they can be put to the simple uses we see in the engine.

The uses of food can therefore be arranged in two general classes, in the order of their relative importance or the order in which death would follow from the disuse of each.

1. Combustion to supply the necessary energy for heat and work.
2. Repair of tissues and growth in childhood.

For instance, cut off the supply of oxygen and death ensues in from one to ten minutes. If water is withheld, preventing the transportation of the fuel and oxygen to various parts of the body, death follows in about two to seven days or more, according to climate, exposure and exercise. If the fuel itself is taken away, death follows in from seven to forty days or more, according to the amount of exposure that would abstract heat, and the amount of work that would use up the energy already stored up in the body. If materials for the repair of tissues be excluded, death follows in a variable time, dependent upon the importance of the tissue that is being starved—a time varying from a week if all nitrogen is excluded, to several months if the vegetable acids are excluded, or even to several years in the case of certain ill-defined rather uncertain conditions having no definite names, and often classified under the head of general debility.

CLASSES OF FOODS.

All foods are divided into well-defined classes according to chemical composition, and the uses of each of these classes are now being worked out with some degree of certainty, which, unfortunately, is far from absolute accuracy. These classes are as follows:

1. *Proteins.*—Substances characterized by the presence of nitrogen, *i. e.*, albumen, vegetable albumen, etc., as found in meat, peas, beans, etc. The other elements are carbon, oxygen and hydrogen, and often phosphorus, sulphur and iron. This class is chiefly used in the repair of the tissues, which, with but few exceptions, are ni-

trogenous. After they are worn out, the proteins deliver up considerable energy while they are being oxidized into such shape as to permit of their being carried out of the body through the kidneys and liver.

2. *Carbohydrates.*—Substances consisting almost entirely of carbon, hydrogen and oxygen, the hydrogen and oxygen being in the proportion to form water—for instance, starches and sugars. These substances are used almost entirely for fuel, though they can be built up into fats, and in that direction may serve to repair wastes of tissues formed partly of fat, marrow of bones, etc.

3. *Fats.*—Substances consisting of carbon, hydrogen and oxygen, the oxygen being in but small amounts. These also are chiefly for fuel, and on account of the lack of oxygen in the composition they have more than twice the heating value of carbohydrates. We find as an invariable rule that when very much heat or energy for work is needed, the man instinctively consumes large quantities of fat, as for instance, men in the polar regions. Fat is the hard coal, while carbohydrates are the soft coal of food. The fats are also used to repair or make tissues containing fats, *i. e.*, marrow of bones, and the cushions of fat under the skin and behind the eye. Every nation on earth uses fat in some form as food.

4. *Certain Stimulants Found in Tea, Coffee and Allied Plants, and Certain Sedatives like Tobacco.*—It is usually considered necessary to have these substances in the high pressure of civilized life. The artificial conditions in which we live have too rapidly brought the nervous system into such a condition that it seems to need these articles if it is to give out the greatest work. Tea, coffee, chocolate and guarana contain chemical substances allied or identical with caffeine, and coca (not cocoa) contains cocoaine, and these are the stimulants in question.

It may be considered of doubtful wisdom to thus make into a new class of foods substances which physiologists seldom recognize as foods, but more of the nature of drugs. The only excuse for making them into a separate class is the fact that they seem necessary; all nations demand them—even the Indian demands his tea.

They are not necessary to life, as many men never use them and live to a good old age, but they seem, in some unknown way, to keep up cheerfulness, and to allow men to do more work and stand more fatigue and exposure than without them. A wise military commander will never permit his soldiers to be deprived of coffee and tobacco. Their absence generates depression, homesickness, feebleness, and leads to defeat in battle.

5. *Salts of Mineral and Vegetable Acids.*—The chief of these is of course common table salt, and there are various others, chiefly sulphates, phosphates and carbonates, which we get in articles of food. A very important class is the salts of the vegetable acids, citric, tartaric, malic, etc. Absence of these is sometimes given as the real cause of scurvy.

The exact use of the salts in the economy is not known. Absence of them will surely cause disease, while their presence in excess may lead to other and just as bad conditions. All we know certainly is that we must have them, and it is a great modern step to know that much.

6. *Water.*—Whose chief use is as a diluent and as a carrier of the above substance. Indeed, from sixty to seventy per cent. of the human body consists of water.

7. *Oxygen.*—Supplied through the lungs for the sole purpose of combustion.

The majority of our articles of diet contain substances belonging in each of the first five classes, and it is rare indeed to find an article that is composed entirely of but one, or even two or three, classes. For this reason it is extremely difficult to experiment with higher animals, by feeding them on but one of these classes of food. If we do prepare the food so as to give but one class, as for instance, protein, death is the invariable rule. For purposes of illustration, the following articles of the ration, from various authorities, are tabulated, with their percentage composition:

PERCENTAGE COMPOSITION OF EDIBLE PORTIONS GARRISON RATION.

	Water.	Protein.	Fats.	Carbo-Hydrates.	Salts.	Energy, calories per lb.
Bacon, fat	20.0	8.00	69.5		2.5	3080
Beans	12.6	23.10	2.0	59.2	3.1	1615
Pork, salt and fat	12.1	.90	82.8		4.2	3510
Sugar, gr.	2.0			97.8	.2	1820
Sugar, brown issue	3.0			96.5	.5	1795
Flour	12.5	11 00	1.0	74.9	.5	1644
Beef	55.0	17.10	27.0		.9	1460
Potatoes	78.9	2.10	.1	17 9	1.0	375
Onions	87.6	1.4	.3	10.1	.6	225
Oatmeal	7.6	15.10	7.1	68.2	2.0	1850
Cornmeal	15.0	9.20	3.8	70.6	1.4	1645
Canned Apples	83.2	.20	.4	15.9	.3	315
Dried Apples	25.0	.90	1.8	71.5	1.4	1418
Tapioca or Corn Starch	2.0			97.8	.2	1820
Butter	10.5	1.00	85.0	.5	3.0	3615
Syrup	43.7			55.0	2.3	1023
Lard	12.0	.60	83.4		4.0	3570
Rice	12.4	7.4	.4	79.4	.4	1630
Canned Corn	81.3	2.80	1.1	13.2	.6	345
Canned Tomatoes	96.0	.80	.4	2.5	.3	80
Macaroni and Vermicelli	13.1	9.00	.3	76.8	.8	1406
Milk, fresh	14.1	.843	.802	1.069	.164	418
Milk, condensed	25.0	17.00	11.0	44.00	3.0	1595
Peas	12.3	26.70	1.7	56.40	2.9	1565
Raisins	40.0	.40		24.00	.6	440
Cheese	35.0	33.00	22.0	5.00	5.0	1600
Prunes	30.0	2.50		12.0	.6	140
Cabbage	92.0	2.10	.6	5.5	1.1	155
Ham	41.5	16.7	39.1		2.7	1960
Apricots, canned	50.0	2.00		30.0	.6	460
Barley		13.00	2.7	76.0	3.0	1800
Chocolate	12.0	20.00	50.0	10.0	4.0	2650
Sausage	41.2	13.80	42.8		2.2	2065
Oysters	87.1	6.00	1.2	3.7	2.0	230
Salmon, canned	63.6	21.60	13.4		1.4	965
Crabs		15.0	1.0			526
Crackers		10.3	9.4	70.5		1900

DIGESTIBILITY.

Of course it must be understood that the human stomach and intestines cannot digest all kinds of protein. Some like hair, bones, tendons, gristle, etc., may pass through unchanged, though the lowest animals may digest them with ease. Bones are as nutritious to dogs and snakes as flesh is to man. In the same way, certain carbohydrates are indigestible. Cellulose, the fiber of wood, has exactly the same composition as starch, but our stomachs and intestines cannot dissolve it, though that is easily accomplished in the

intestines of goats, cows, asses, etc. A sheet of brown paper (cellulose) is as nutritious to a goat as a soda cracker is to man.

Finally the articles of diet must be so broken up by cooking that the weak human stomach can digest them. Many thousand years back our stomachs were probably as strong as a dog's or a horse's, but by partial disuse, that is by our becoming dainty and insisting on more delicious cooked food instead of the raw meat and vegetables we may have eaten, our stomachs become weakened, and it is probable that they are becoming weaker as generations go by, so that in the future our food will require far more preparation than it does now. The soldier's ration 2,000 years hence will be as much daintier than the present one, as the latter is superior to the stuff we are told was fed to men of ancient times.

AMOUNT OF FOOD.

Now let us look at the relative proportions and absolute amounts in which these classes of food should be served. Oxygen is of course omitted, and the water can be dismissed with the statement that it is taken according to the demand, some days during perspiration several quarts, in other moist days when there is little perspiration in as little amount as one pint, over and above that in the food. When the water has to be limited, as on shipboard, the amount on hand will determine what is to be given to each man. Any further discussion is out of place here.

The proper relative and absolute amounts of the other classes for a man in health is a complex problem, and yet unsolved. It depends so entirely upon the work and surroundings that no rule can as yet be formulated.

The following table shows the amounts that have been experimentally determined as having actually been supplied. The people experimented upon have been in apparent health, and there is no good reason to say that any of these are markedly incorrect in either direction:

	Grammes.			
	Proteine.	Fats.	Carbohydrates.	Potential Energy of Nutrients.
Sewing girl, London wages 93 cents per week	53	33	316	1820
Underfed laborers, Lombardy, Italy	82	40	362	2190
University professor, Munich	100	100	240	2325
Lawyer, Munich	80	125	222	2400
Physician, Munich	131	95	327	2760
German soldiers, peace footing	114	39	480	2800
Well paid mechanics, Munich, Germany	151	54	479	3085
German soldiers, war footing	134	58	489	3095
U. S. travel ration	135	132	400	3400
Hard worked weaver, England	151	43	622	3570
Factory operatives, mechanics, etc., Massachusetts	127	186	531	4430
U. S. garrison ration	152	180	570	4621
German soldiers, Franco-Prussian War, extraordinary ration	157	285	331	4650
U. S. field ration	85	280	500	5000
Machinist, Boston, Mass	182	254	617	5640
Brewery laborer, Munich, very severe work	223	113	909	5690
College foot ball team, food eaten	181	292	557	5740

ERRORS OF ESTIMATES.

We must take with considerable allowances any estimates of the proper daily amount of food that a healthy man should have. At present the experimental errors are entirely too large to be disregarded. Without going too deeply into this technical part of the subject, it may not be out of place to mention some of these errors, more to emphasize the statement already made that the selection of the ration is yet within the sphere of practical men, and that science is not yet ready to dictate what the exact relation should be.

The exact food value of any article of diet is not known. 1. The operations determining its chemical composition are exceedingly complex, and have correspondingly large errors of operations and instruments. 2. The chemical composition is rarely the same in two specimens, so that if we find out the approximate composition of a pound of potatoes, for instance, we are not sure that the next pound of potatoes issued will have anywhere near the same composition. Practically we depend on the average of many determinations, and it is well known that averages are exceedingly unscientific where accuracy is demanded. 3. The chemical energy similarly varies in different specimens of any dietary article. If we find out that a pound of one baking of bread, twenty-four hours old, will give up a definite amount of heat, that will not assure us that the next

baking will be exactly as valuable for fuel. 4. The chemical energy is always determined outside of the body by burning the article in question in appropriate apparatus. It is always assumed that the same amount of energy will be delivered up in the body by the slow combustion. This is an error, because the results of combustion are not the same in the two cases, though of course by great care in making proper allowances, the error might be quite small. 5. Having determined the food value, we are still confronted by our incomplete knowledge of how and where oxidation takes place in the body, what part is used for fuel, what for repairs, what for energy, and what for heat. The food may be improper, and not deliver up its total energy, on the same principle that wood in a coal stove, or coal in a wood stove, will neither of them give out the full measure of its heat. 6. There is the error of supposing that all the food eaten is necessarily consumed in the body. Faulty digestion causes immense wastes, and the real causes of this waste may be found in the faults of preparation, preservation or cooking, or in diseased states of the body, either temporary or chronic. Improper mastication is a source of very great loss among men, just as it is among horses and cows.

Even should the most exact determinations of food value be made, there are individual peculiarities among men, which at present baffle all attempts to determine the exact amount which any particular man should have. Many of these variations are due to the fact that some men habitually work more than others, and thus require more food. Some men habitually lose more heat than others, on account of difference of build, circulation of blood, clothing and exposure. A large man loses a less percentage of his heat than a small man, on the mathematical principle that the larger the body the smaller is the surface per unit of mass. A large cube of hot iron cools off far more slowly than the same iron drawn into wire. We see robust, heavy men comfortable in a light apparel that would cause the death of a thin, small man. The matter of clothing is also regulated by habit, because constant exposure so benumbs the nerves regulating heat production, that they will not allow heat to enter the surface of the body, to be lost by radiation. The Indian knew this practical point, when he said his body was "all same like white man's face." One man may eat huge quantities and then allow the heat to escape by being insufficiently clad, while another equally healthy man may eat very little and clothe himself so warmly that very little of his heat is lost. This is known for steam engines, which are nowadays carefully clothed in jackets of non-

conducting materials. The farmer also knows it, for by carefully housing his cattle he knows that they require less food than if they were exposed to the weather. Well clad and sheltered soldiers require less rations than poorly clad men exposed to the weather—a good thing to know in times of great privation. Then there are the errors of appetite—some men habitually eating too much, while others eat too little. Our first intimation of such errors comes with the diseases brought on by the accumulative effects of the small errors of many years. It is only fair to remark that all the above errors are believed to be small, and may neutralize each other; yet they may all act together and produce a large error of diet. In this way we can account for occasional attacks of indisposition, which are inexplicable on any other theory. In due course of time knowledge of the subject will be so complete that the above errors may, in great part, disappear.

APPROPRIATE FOOD.

It is not to be supposed that after we know the exact amount that any given man must consume in certain conditions of work, etc., we can give him the proper food. There are many different kinds of articles of each food class, and some of them may be digestible and useful to one man, while they would be useless to another. An infant can thrive on food that would starve an adult, and there is the same kind of difference, though less in degree, among adults themselves; in other words, the food must be appropriate, and it is to be confessed that our knowledge on this point is not complete by any means. There is an old saw which says: "What is one man's meat is another's poison," and in giving our adherence to this practical rule, we confess that for a long time to come we must, in the selection of our diet, be somewhat guided by appetite and individual experiences.

For some reason or other it is absolutely necessary to have fresh meats, fresh vegetables, and fresh fruits—all three. Many scientists may say this is going too far, but it is probably not. Why fresh things are needed is not known, but it is believed to be due to the fact that the body thus received certain salts and unknown substances necessary as stimulants or tonics to the tissues, which salts and substances are destroyed by the usual methods of preservation. It is not to be denied that men may live for many years without tasting such articles of diet, though it is rare for a man to be denied all three. If they are so denied they are not possessed of that health which permits of the highest mental and physical development;

they may be stunted physically, or may be of a very low order of intelligence.

Finally, *variety* of food is necessary, at least in man. This point should be constantly in the mind of the company commander, though it is of no importance when the men are hard at work. In such times of excessive work and great exposure, the appetite is so enormous that an unvaried diet does no harm. In the comparative inactivity of garrisons and prolonged camps sameness of diet cloys, and there may follow from this cause stomach and bowel troubles, with all the attendant nervous symptoms of depression, melancholy, discontent and homesickness, all of which have been known to turn a brilliant military campaign to final disaster.

As all armies in the world have been fed on the same general principles, there is an opinion, often expressed, that the dryness and the sameness of the food is a great factor in the production of the tendency to drunkenness, proverbial among soldiers and sailors. Drunkenness can never be eradicated from an army. The class of men from whom the soldiers are recruited are not teetotalers, but it is safe to say that there has been a phenomenal decrease in the amount of drunkenness in recent years, and it may be justifiable to predict a still further decrease as the food becomes more varied. The writer once canvassed the men at a small post, Fort Gaston, Cal., and found that there was a large per cent. of total abstainers, and at that time he was certain that it was a larger percentage than among mechanics and laborers in civil life; but the post was most favorably situated—was blessed with an enormous garden for vegetables, there was profusion of fruit in season, and game could be obtained throughout the year. As elsewhere mentioned, the sameness of diet of German soldiers during the Franco-Prussian War, when erbswurst was used, was compensated for by the large stores of wine found in the vicinity of Paris, and by the occasional issue of brandy, a still further proof of the tendency to drink alcoholic beverages when food is scanty and unvaried.

Variety is necessary in the army for another reason: When the diet is very simple there is apt to be constipation, and in the field this condition is sometimes quite marked. It is recognized by physicians that chronic constipation cannot be properly treated with drugs, and it must be rectified by diet. The field ration, if possible, should overcome this tendency to constipation. Sluggishness of the bowels quite commonly goes along with discontent, homesickness among soldiers, and in such conditions the soldier is not a reliable fighter—he is easily beaten. Dessicated fruits are often lauded for

this purpose, but there are officers who say that such articles are usually unsuccessful in the long run. Variety of diet, with fresh fruits and vegetables, are of course the chief of the means to be used in combating this tendency to constipation.

The serving of food is an important point, particularly in the army, for it is apt to be forgotten in feeding large numbers of men. If the conditions of the table and dining-room are such as we usually call appetizing, it is an actual fact that the digestive fluids of the stomach are poured out in large and efficient quantities. If these conditions are bad the fluids are not secreted in sufficient quantity, owing to a reflex nervous action of the nature of nausea, though nausea may not be present at all. In the latter case, digestion is faulty, and the food eaten may be partially wasted. People get thin if their food is served badly, even though it is in profusion.

This great attention given to the dining-room and serving of food has a very decided elevating effect upon men. In civil life unusual brutality in men is not infrequently accompanied by the grossest table manners, and each is cause and each is effect, reacting upon one another. Compel a man to observe decency at table, supplying him with a neat, clean and orderly outfit, and the elevating effect is sure to come. Military men of the last century believed that to keep a soldier up to a proper discipline he should be clothed roughly, given the simplest kind of overcrowded barracks, and fed like a hog, every modern improvement being considered enervating. Could any of these dead officers see the dining-rooms of some of our soldier barracks, they would surely think that the service was going to the dogs.

APPLICATION OF RULES TO THE RATION.

We now come to the special application of the above outlined principles to military necessities. As far as the actual food in garrison is concerned, little need be said when the post is so situated that it can get the outside help from canteens, gardens, convenient markets, and has a good company fund. Experience shows that under such circumstances the soldier lives well, and there are no physiological rules or military necessities which make the soldier's food a particle different from that of civilians. The whole matter is in the hands of the company commander and cook. If the former is a good practical manager and the latter is not a fool, all goes well and the men have good food. There is plenty and in good variety. The actual energy supplied is usually in excess of what is needed.

The manner in which the company commander is to secure necessary variety in such circumstances is a matter of practical management that is beyond the scope of this paper. A hint may be thrown out as to the loss that sometimes occurs from the inability of cooks to utilize scraps and small wastes. In a few companies the waste is more than there is any necessity for. Though the soups made from bones have but little food value, they are invaluable from the increased variety. They can be made the vehicle for the nutriment of peas, beans, etc. If it is ever possible, the soldier should have soups every day. In regard to the purchases of lard, butter and molasses, it might be said that if the fund allows, they should always be secured. As for the vast number of extra articles that are usually secured, the matter depends on the likes and dislikes of the soldier and the ability to buy.

In all circumstances where the company commander is so situated that he can buy, there are a few physiological rules that should be kept in mind, not that they are neglected at all, for they are usually carried out on general principles. In very cold weather the soldier must not be stinted as far as the best heat producing foods are concerned—that is, the fats. Butter, lard, fat pork and bacon are all appreciated, and the colder the weather the more important they are, as every one knows who has read anything about expeditions to the far north. In very hot climates there must be a minimum of the fats, though they cannot be excluded entirely, but if there is much work to be done, the foods must be such as will render up much energy, but not be as heating as fats; in other words, the carbohydrates—starches and sugars, as in rice and hominy. The severest kinds of labor are easily performed by Asiatic nations on a spare diet of rice, with some grease mixed with it. In hot climates, also, it is necessary to supply fresh green vegetables and ripe fruits. Money spent in that direction is never wasted.

We now come to that sad state of affairs when the post has no canteen, no garden, and no convenient markets, and the company is minus a fund for extras. The issued ration is to be depended on. There are still no military necessities that enter into the problem. It is a condition and not a theory, that confronts us. In a former article on the ration, a discussion of the issued ration ends with the following statement: "It may be justifiable, therefore, to express a doubt as to whether in the long run the bare, unadorned, unvaried ration as issued, will tend towards the production of perfect health and the greatest efficiency, if eaten to the exclusion of everything

else." A medical officer, who is an expert on such subjects, and who was believed to be inclined to the opposite view, writes in regard to the above, as follows: "I can go further, and say it will *not* tend to the production of health," etc.

In other words, though the men may get as much carbon and hydrogen as physiology demands they should, the variety is so poor, and there is such a deficiency of fresh fruits and vegetables that the men will actually sicken. Fortunately the company commander is seldom placed in such deplorable circumstances. He can do nothing. The manner in which the ration should be supplied in such cases will be treated on below.

RATION IN THE FIELD AT PRESENT.

We now come to the ration in the field. When in permanent camps, near markets and where the company can buy, the conditions are the same as in garrison, provided, of course, that fresh meat is supplied by contractors, or cattle are driven along. This matter can then be dismissed.

When the troops have gone to the interior at a distance from the base of supplies, the regulation field ration is to be depended on. Now for the first time we come to the point where military necessity has upset recognized laws of health. When in the field we drop the question, "What is best?" and are governed by the question of "What we can get?" It is here that the future is to see scientific principles applied to the feeding of the soldier.

The field ration is notoriously deficient, in proper ingredients, in amount, variety and proper proportion, and the men are apt to be hungry if they are to depend on it alone. If transportation is so deficient that only bacon, hard tack and coffee can be carried, actual scurvy is the result. The company commander must secure something else for his men. The lack of fresh vegetables and fresh meat is the chief fault. This deficiency of the field ration has already been known. Congress over a hundred years ago passed a law giving to soldiers on the frontier a far greater food allowance than those farther east. At the beginning of wars the ration is apt to be increased, though subsequently diminished at the close of the war, and the soldier compelled to get the balance the best way he can.

In 1777, the law of June 10th, authorized the commissary general of purchases to hire land and raise vegetables, if they could not otherwise be obtained. Ever since then it has been expected of the United States soldier to become a truck farmer and raise part of his

own food. If he served where no garden was possible, because of poor soil, or if he had to leave the post for the field and neglect his garden, he must suffer—that is what he enlisted for. Formerly there was some excuse for this state of affairs, when the posts were so isolated that fresh vegetables could not be taken to them.

There is no excuse for it any longer, and we must not blind ourselves to the fact that old laws seldom fit new conditions.

Civilians who give much study to scientific food questions have a poor opinion of the field ration, and many are the suggestions they make to improve it.

[TO BE CONTINUED.]

A PORTABLE RAMP.

By Captain W. H. CARTER, Sixth U. S. Cavalry.

THERE has recently been constructed at the Military Prison, through the courtesy of the Commandant, Captain Pope, a portable ramp for loading and unloading horses from railroad trains in open country where no platforms exist. The plans were prepared by Major E. G. Fechét, Sixth U. S. Cavalry. The ramp was, upon completion, turned over to the squadron at Fort Leavenworth for experimental use, and was tested by loading horses at the Missouri Pacific station. It worked easily and satisfactorily.

The ramp, although made of well-seasoned lumber, is very heavy, weighing 750 pounds complete. It is over fifteen feet in length, and five feet wide. It seems unnecessarily long, and might be reduced in width, inasmuch as horses are always loaded and unloaded one at a time.

The plan is susceptible of much variation, and each cavalry post where troops are liable to be ordered on service by rail, could readily supply itself with a portable ramp from material usually found about posts. The simplest form would be a platform of three planks, not more than two inches thick, ten to twelve feet long, and from twelve to fourteen inches wide. Such a ramp would weigh about four hundred pounds. Lariats could be stretched from the sides of the doorway to picket-pins at the foot of the ramp, and saddle-blankets hung on the lariats to prevent the horses from stepping off. Each board should be provided with grip-irons to catch the door-slide or car floor.

Cavalry officers are frequently at their wits' ends to find material for ramps, for cattle pens and loading chutes are rarely in the right place. Railroad ties, baled hay, and sacks of grain covered with earth, have frequently been used by our cavalry in preparing tem-

PORTABLE RAMP

for

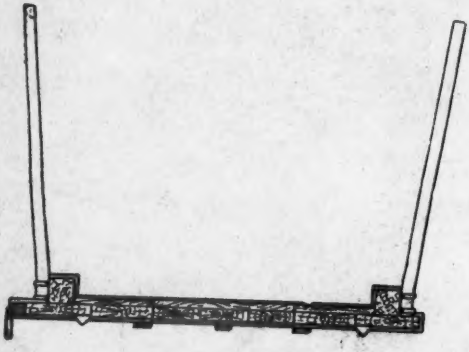
LOADING HORSES IN R.R. CARS.

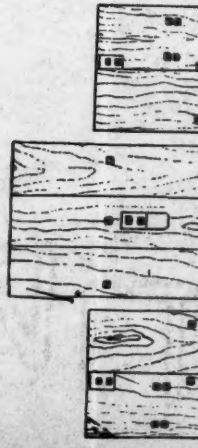
MADE IN SECTIONS.

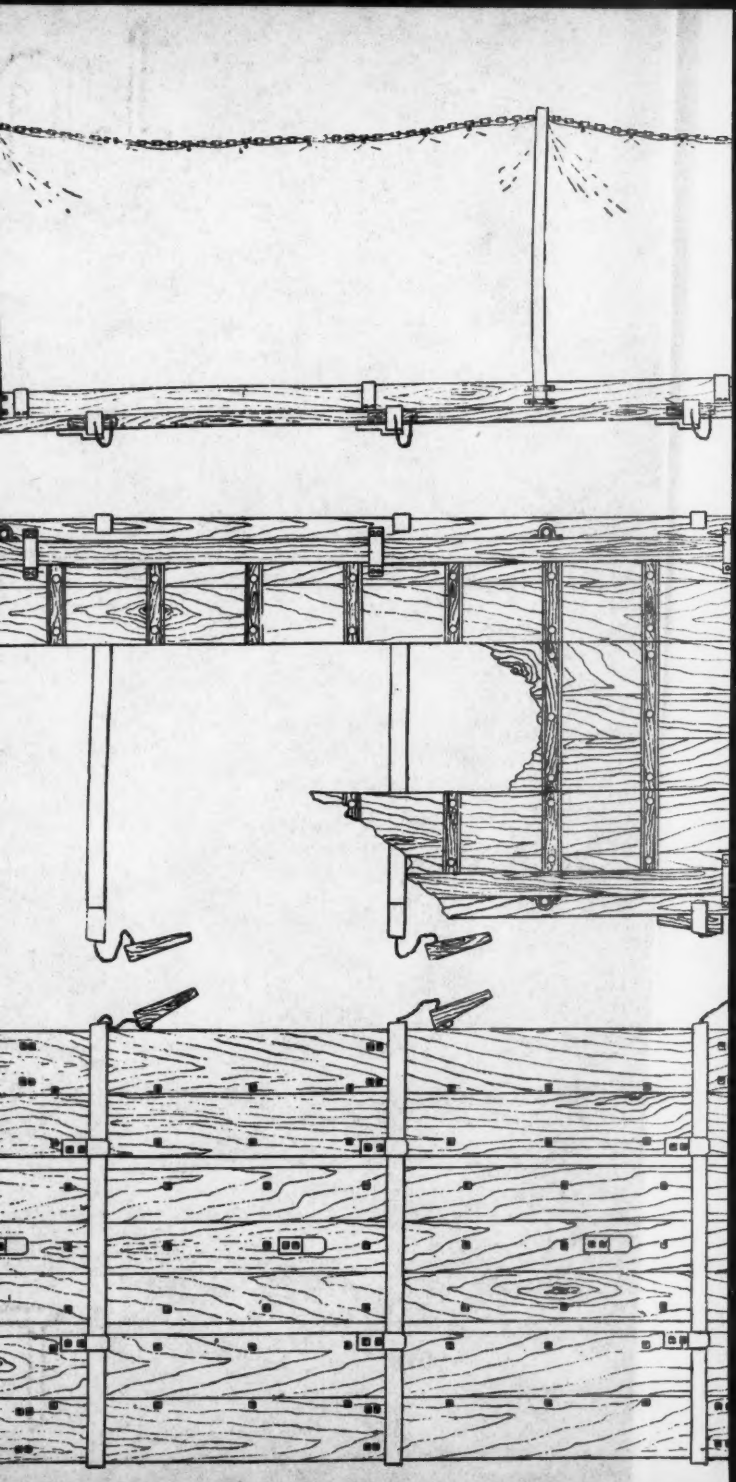
Invented by

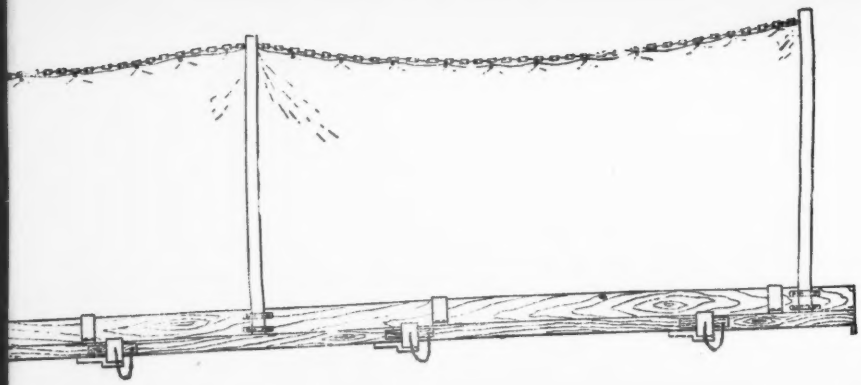
MAJ. E. G. FECHET,
6TH CAVALRY

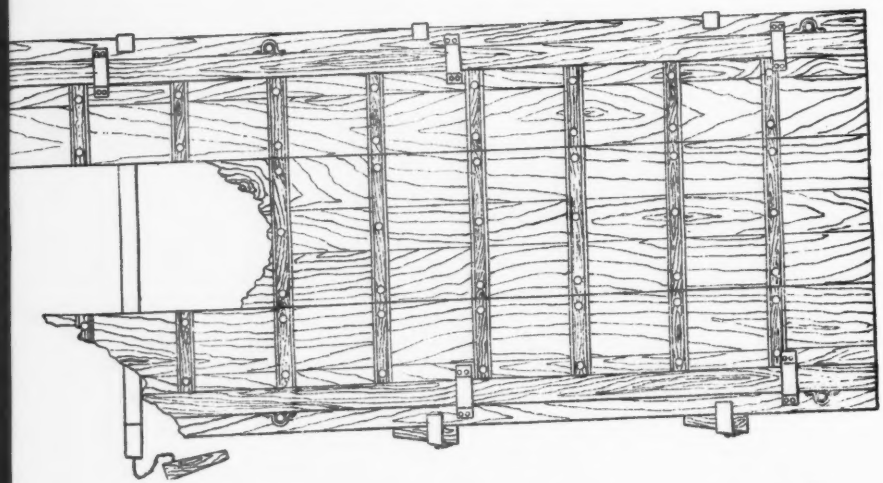
SCALE 1"=1'

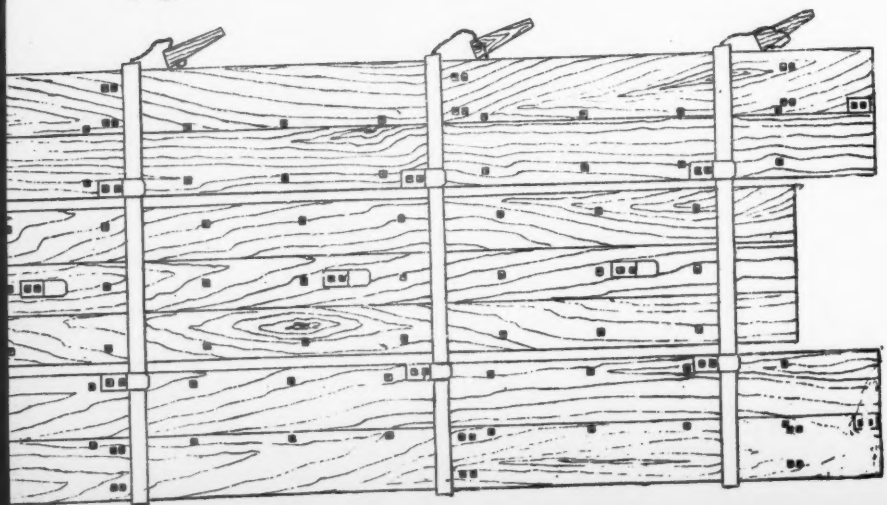












porary ramps, and if one of Major FECHÉT'S ramps will save the annoyance and trouble incident to one of these makeshifts, it will well repay the expense of its manufacture.

The accompanying plans show in detail a very complete form of ramp which, made of hard wood, with iron braces and stays, and chain guards, will weigh about seven to eight hundred pounds. It hardly seems necessary to explain the plan, which is simply and clearly drawn.

Lieutenant-Colonel VOLKMAR, Assistant Adjutant-General, found a heavy wooden ramp in use in the Pennsylvania National Guard during the riots, and the idea of improving on that, in the matter of lightness and portability, was taken up, with the present ramp as a result.

PROFESSIONAL NOTES.

THE BUFORD MEMORIAL.

A movement has been initiated by some of the friends and admirers of the late Major-General JOHN BUFORD, U. S. V., (Major and Assistant Inspector General, U. S. A.) among the survivors of the Class of 1848, U. S. M. A., the cavalry of the Army of the Potomac and cavalry officers of the army of to-day, to commemorate, in a suitable manner, that gallant soldier's deeds.

The important service rendered to the country by General BUFORD at Gettysburg, July 1, 1863, has not received the substantial recognition it deserves. At a critical moment he, with two small brigades of cavalry, having seized a position (which proved to be of inestimable value) held in check for several hours, a corps d' armeé, until the coveted ground could be occupied by the main body of the Union army. While the famous battle-field is covered with many beautiful and imposing monuments to departed heroes, there is no stone to mark the place of BUFORD's important achievement, creditable, as it was, alike to him and to the arm of service of which he was so fine a type.

His military career illustrates the value of professional training and experience combined with the prestige of martial antecedents. JOHN BUFORD came of a family of pioneers and patriots. On his father's side they were among the earliest to develop the "Blue Grass" section of Kentucky, and to raise the thoroughbred horses for which that region is famous. His maternal grandfather was an officer under "Light Horse HARRY" LEE of the Revolution. Graduated at the Military Academy in 1848, BUFORD was brevetted a second lieutenant of dragoons; serving in New Mexico, Kansas, Utah, in Indian and Mormon campaigns, both in the line and staff. He became by regular promotion in 1860, a captain in the Second Dragoons, and in 1861 was appointed an assistant inspector general in the army. In July, 1862, his recognized fitness for command brought BUFORD the unsolicited commission of brigadier-general of volunteers. He was at once given a brigade and from that time, until cut down by disease contracted in the line of duty, he

was constantly in the field, sharing in the arduous service of the campaigns of 1862 and 1863 in Virginia and Pennsylvania. He became a division commander long before the appropriate rank of the command was conferred upon him, and it was only a few hours before BUFORD's death that President LINCOLN, reminded of his gallant and important service, sent him, with words of sympathy, a commission as major-general.

It has been truthfully said of General BUFORD that "he had no superior as a cavalry officer in the Army of the Potomac—perhaps not in the world—at the time of his death." "He was modest, yet brave; retiring, yet efficient; quiet, but vigilant; unostentatious, but prompt and persevering; careful of the lives of his men with an almost parental solicitude, yet never shrinking from action, however fraught with peril, when the time and place for such action had come. His skill and courage were put to stern and decisive tests on many hard-fought fields, and they were always equal to every emergency."

And so it seems fitting that the surviving comrades, friends and admirers of JOHN BUFORD shall unite in placing a substantial memorial upon the ground of his greatest exploit, to commemorate the virtues of a modest and unselfish soldier, who claimed nothing for himself, foretold for every cavalryman and horse artilleryman, there present. "We shall all remember with pride that at Gettysburg we did our country much service."

The affair is in the hands of an executive committee of which General MERRITT is chairman, and the following named officers members: Generals WILSON, SWEITZER, DUANE, TIDBALL, FORSYTH, SAWTELLE, RODENBOUGH, TOMPKINS, LEIPER; Colonels DODGE, MIZNER, PARSONS, WEIR, KIP, WADE, COMPTON, MEADE, LEOSER, ARNOLD, PENNINGTON, ELLIS, HUNTT, PRESTON, BIDDLE, CARLTON, GORDON, NEWHALL, HEERMANCE, MARTIN, CARPENTER; Majors WHEELER, WHITEHEAD, CALEF, BATES, CARR, QUIRK, HARRIS, LOCKWOOD; Captains FRAZIER, BOEHM, FURNESS, WELSH, PENN-GASKILL and a few others who have been invited to join the association. It is proposed to raise a fund of about $3,000, and to have the memorial in place on or before July 1, 1895. The first meeting of the executive committee to perfect arrangements will be held January 5, 1894, at the office of the Buford Memorial Association, room F, fifth floor, Army Building, New York City, where further information may be obtained from the secretary, General T. F. RODENBOUGH, U. S. A.

The announcement of this project has already elicited many enthusiastic expressions of sympathy and encouragement and it has every prospect of the success it deserves.

It should be distinctly understood that this is a BUFORD movement, pure and simple, and not a matter for the glorification of any particular corps or division.

THE CALIBER .38 REVOLVER.

The contention (CAVALRY JOURNAL Nos. 20, 22) of Lieutenant (now Captain) SWIFT, Fifth Cavalry, in relation to the unfitness of the comparatively small caliber (.38) revolver for mounted men is so manifestly correct that, in view of the adoption of this weapon, it seems proper for those who agree with him to add a support which otherwise would be superfluous.

In an apparent desire to approach the reduced bore of the infantry rifle, the essential difference between the two weapons seems to be overlooked. The modern rifle, with its extreme range and with the flattened trajectory of the new missile, will admirably discharge the functions of discouraging the advance of the adversary and of stimulating his retreat. If by showers of bullets at long range many casualties are inflicted, those wounded will promptly fall to the rear and those not yet struck will cross the intervening danger zone with extreme reluctance. And the immediate influence upon a campaign of the wounded, who not only are taken out of the fighting line but who encumber their army, is much greater than that of those killed outright, who require burial only.

But the use of the pistol by cavalry is very different from that of the rifle by infantry. The pistol is not the assistant of the carbine, it is the complement of the saber. Its occasion is the *mêlée* and its purpose is to disable the enemy on the spot. Few men wounded, even slightly, at a considerable distance from the line of fire, will be brought up to that line on foot as direct assailants. In its range and its magazine action lies the power of the rifle. But when the pistol comes into play the enemy is at hand and is closing in with an energy and at a rate that he himself cannot always control. Here, as Captain SWIFT properly contends, he must be brought down at once. The cool skirmisher is alive to every injury and may fall back, substantially at his own discretion. The trooper, charging as a forager or in line, has reached a state of nervous exaltation that renders him practically insensible to injuries that do not disable him mechanically. He must be badly wounded or he will fight his way through, perhaps to victory. A courageous man in the heat of combat is put out of the fight only by being killed outright, by having his pistol or his sword-arm broken, or by the effect of nervous shock. The missile should be such as would disable, whether striking a vital spot or not. It is true that momentum represents mass multiplied by velocity, and theoretically a large body moving slowly and a small body moving rapidly may produce the same effect. Practically that is not true when the human body receives the impact, because the resisting vital element is an uncertain and variable factor; and the higher the nervous pressure, as it may be called, the greater will be that form of resistance. As a rule savage races possess more of this power than other communities. We do not know, and we probably shall never know, how to estimate or to measure this nervous resistance. It is, therefore, wise to use a wide margin. Within anything like reasonable limits, mass is the important lethal agent.

After the introduction of the original, or pepper-box, revolver, it was observed in the surgical practice of the large city hospitals that, while pistol wounds increased in frequency they were much less severe. The older injuries were made by a heavy bullet thrown from a large caliber single-barrel pistol, which did serious execution. Then followed the small caliber, multiple weapon, and the balls it threw were of no particular importance. That, impressed upon me by a gentleman of large experience and eminent in his profession, was one of the first lessons I learned as a medical student, and my observation has ever since confirmed its truth. To bring down large game heavy bullets must be used, and to the practical hunter that statement is axiomatic. The shape of the bullet, its enclosure or jacket, the charge, all enter into the formula of effectiveness, but the great factor is mass. To drop a man in his tracks requires the blow of a bludgeon, not the play of a rapier. Besides the man, his horse has to be considered. Infantry fire against cavalry is entirely apart from the pistol practice of trooper against trooper. While the rider is the principal target, to dismount him by disabling his horse is a great advantage, whether gained by accidental or by intentional shots. The horse in motion is himself a missile not to be despised. But a horse will carry off a good deal of lead distributed in small fragments before he falls. I am not at liberty to designate the place, but in experimenting with a small caliber rifle a condemned mule, grazing in a field, was struck at moderate range. The animal threw up his head for an instant and then continued feeding as though undisturbed, although the bullet had passed directly through the body. The incident carries its own moral.

Of course the whole question turns upon the point whether a .38 bullet has size and weight sufficient to give the required shock under the circumstances. It seems to me that the weight of experience is with the negative, and that a reduction in caliber, the character of the projectile remaining the same, will handicap the men deprived of the heavier missiles.

The mechanism of the weapon is a subject upon which I have no opinion to present.

ALFRED A. WOODHULL,
Major Medical Department,
Brevet Lieutenant-Colonel, U. S. Army.

Referring to the article by Captain EBEN SWIFT, Fifth Cavalry, in the September JOURNAL, it appears that when eleven out of thirteen cavalry officers report in favor of the adoption of a particular arm, and the views of this large majority are accepted, after ample experiments by the Ordnance Department, Captain SWIFT feels justified in asking for the data on file in the reports, to "remove the impression that the new revolver is not an efficient weapon, and would not induce that confidence which all soldiers should have in their arms."

Captain SWIFT also says that "it does not seem that the sentiments of the service are expressed by the eleven officers," but he gives no data to justify his conclusion. Aside from all questions of

arms or their relative value, I believe the cavalry will always abide by the decision of so large a majority as eleven to two on any question affecting its welfare.

I am not an expert pistol shot, and may therefore consider that I view the subject simply as the average troop commander will do when called upon to instruct his troopers. I have heard a number of officers at various times express the opinion that a caliber .50 pistol, with a light charge of powder, adapted to accurate shooting at about forty yards, would be the best kind of pistol for cavalry.

I know but one officer who favors the revolver recently abandoned. He is an expert shot, but his own shooting is sufficient condemnation of the weapon, because at all the ranges within which a pistol should be used he never aimed or pointed at the object to be struck, but at some point in the air, which his experience had taught him would give about the necessary correction for error and overcharge.

The objections to the caliber .45 Colt's pistol are numerous. It is heavy and too large for nearly all our men. The handle cannot be held firmly while the pistol is being cocked. I have watched closely, and do not remember many men who could cock the pistol without having to pitch it up to regain the position of the hand for shooting. This is the moment when so many accidental discharges are made. I do not claim that the caliber .38 Colt is perfect, for I see no reason for so long a barrel, and for mounted service it would work easier if the cylinder opened to the right instead of the left. There are no defects which cannot be corrected, in my opinion, after the pistol has had a trial by the entire cavalry.

I admit that the tests applied to the caliber .38 pistol by the Ordnance Department while severe, did not include "stopping power." Mr. BENNETT, the President of the Winchester Arms Company, in a letter to me, says: "We think that stopping power is something that nobody has any exact information about," and undoubtedly the records will bear out the truth of his statement. If penetration tests could be applied in the discussion we could get some exact information, for with targets of seven eighths inch clear, dry pine boards, set up one inch apart, at a distance of fifteen feet from the muzzle, the 38–56 W. C. F. cartridge used in Winchester rifle gave a penetration of eleven boards, while the 45–90 W. C. F., fired under similar conditions, gave a penetration of thirteen boards. I selected this experiment because it was not made by the Ordnance Department, and had no connection with the adoption of the new revolver. No conclusion can be drawn, but admitting that the caliber .45 has greater "stopping power," provided the initial velocities of both arms be the same, I must still agree with the Ordnance Board that this "is no material disadvantage if it still remains sufficient," in connection with the many points in favor of the caliber .38.

Undoubtedly a large express rifle with explosive bullet will stop a buffalo or horse with more certainty than an ordinary rifle, yet horses in battle have been known to finish a charge when mortally

struck by cannon balls. Then again, our medical records are full of instances where balls fired into human bodies, have acted in unaccountable ways, instead of exercising their legitimate stopping power. We of the cavalry always point with pride to the work done by the mounted force during the Civil War, yet a large part of this force was armed with caliber .36 Colt and Remington pistols, many of which are still on hand in our arsenals. This was the pistol known as the "Navy," the "Army" pattern being caliber .44.

It is quite generally believed by my acquaintances in the cavalry that the pistol, although a necessary part of a cavalryman's equipment, has a very limited field of action in war, its use being confined to combats between small detachments. In all such warfare would it not be more profitable to shoot the man and capture his mount for our own use, rather than bring the "stopping power" to bear upon the animal? Pistols are not very effective in the hands of the average young soldier in a charge, and no cavalry officer worthy of the name would receive a charge in line, expecting to break its force by pistol fire. It would require something more accurate, no matter what the individual stopping power of the pistol might be, to destroy the effect of a charge once arrived within the limits of average pistol range.

W. H. CARTER,
Captain, Sixth Cavalry.

ARMY VETERINARY SURGEONS.

Although the veterinary surgeons of the United States Army have met with defeat after defeat for the past six years in their fight for a proper recognition by Congress, and although they are handicapped financially, professionally and socially on entering the service, nevertheless they have decided to make one more effort in this direction, and for this reason a suitable bill has been drawn up and introduced into both houses of Congress with a hope that it may receive some favorable consideration.

The veterinary surgeons in the several cavalry regiments receive but $75 per month, with the exception of the Seventh, Eighth, Ninth and Tenth Regiments, where the pay of the senior veterinary surgeon is $100. It is certainly difficult to retain good men at this small compensation, and if retained it is too much to expect that they should manifest the same interest in their duties they would if their compensation, prospects and status — which is only that of an enlisted man, they being given the rank of sergeant-major — were more in accord with their professional dignity and self-respect. The service gains nothing by the continuation of this undeserved treatment of a small body of men — fourteen in number — whose services are in constant demand, and upon whose judgment and intelligence often depend the lives and value of a whole troop of horses in cases of outbreaks of contagious equine diseases.

If he occupied a position wherein his opinions on professional subjects would have some weight, intelligent changes for the better could certainly be made in the feeding, watering and stabling of

public animals. Yes, even the shoeing could receive intelligent and scientific supervision. The remounts could be examined by veterinarians who know exactly what a cavalry horse should be and the type called for by his individual regiment. In passing the bill Congress would increase the appropriation for army purposes but slightly, and this increase would be more than saved by the improvement that would eventually be brought about in the health and welfare of the now badly abused cavalry horse.

The cavalry officers of the service have for years been in favor of improving the prospects of the veterinary surgeons in the army, and have given their endorsement to every reasonable bill for this purpose introduced into Congress. The bill has the endorsements of General SCHOFIELD and the Quartermaster-General, and it is hoped that it will receive the encouragement of the officers in the service who are acquainted, from personal observation, with the condition of the veterinary service in the U. S. army to-day.

GERALD E. GRIFFIN, D.V.S.,
Veterinarian Fifth U. S. Cavalry.

RHYMING RULES OF HORSEMANSHIP.

The following "rules," which have grown up with the English love of horsemanship, have been brought together for the first time, and may prove of interest to readers. There are a number of variations of some of them. The rule of the road is applicable to Britain. The first and last are familiar to all; the others are not so well known:

I. JUDGING RULE.

One white leg buy a horse;
Two white legs try a horse;
Three white legs look about a horse;
Four white legs go without a horse.

II. RULE OF THE ROAD.

The rule of the road is contrary quite
In riding or driving along
If you turn to the left you are sure to be right,
But if you turn to the right you'll be wrong.

III. RIDING RULE.

Your head and your heart keep boldly up,
Your hands and your heels keep down;
Your knees keep close to your horse's sides,
And your elbows close to your own.

IV. DRINKING RULE.

Cider on beer—
No fear;
Beer on cider—
No rider.

V. THE GOLDEN RULE.

Up the hill gallop me not;
Down the hill trot me not;
On the plain spare me not;
In the stable forget me not.

— *The Rider and Driver, New York.*

A LEAP IN THE DARK.

[From The Rider and Driver, New York.]

The greatest leap in the dark ever made by horse and rider, from which the latter survived to tell the tale, was that made by a young officer, afterwards known as Major-General W. YORKE MOORE. It took place of a dark June night in 1848, at the Island of St. Dominica, in the West Indies. MOORE, who commanded the troops on the island as colonel, lost his way in the dark. He came to several little objects imperceptible to him, which he forced his horse to surmount. At last something, which his horse greatly dreaded to face, was in his onward route. The soldier, after several vain attempts to persuade his horse to proceed (as the Colonel thought) straight towards home, ultimately put the animal at almost full speed, violently spurring his sides the while. The horse violently jumped into the air, clearing what proved to be a little low ledge, to drop 237 feet perpendicular height upon the rocks by the seaside. As if to support the theory that when a man sits properly in his saddle, it is the horse, and not he, who suffers by a tumble—for MOORE says, "during the fall I stuck to my horse"—every bone in the steed's body was broken, while his master escaped alive with severe cuts about the body and head, a dislocated ankle, and a back benumbed by the concussion of the fall. On recovery from the shock, MOORE sent an artist to make a drawing of the spot, and an engineer to survey the place. The drop was considerably more than half the height of St. Paul's, and double the height of the Duke of York's column at the bottom of Regent Street. Such an extraordinary tale is almost incredible, but it is given by a general of high character in a letter dated "University Service Club, 18th March, 1860."—*London Live Stock Journal.*

BOOK NOTICES AND EXCHANGES.

CAVALRY LITERATURE, ETC. By Major G. H. Elliott, III. Bengal Cavalry. Calcutta, India, 1893. Government publication.

In this work will be found what many cavalry officers have long and ardently desired to have—a list of nearly all the books which have ever been published on the subject of cavalry, its organization, maintenance and handling. The works on the cognate subjects of the horse, his care and training, have also found a place in the catalogue.

With this book as a guide, a cavalry officer should be able to select nearly all the works required for the formation of a professional library, from which he could draw all the theoretical knowledge—that based upon the actions of men of recognized merit in war—necessary to prepare him for actual work in the face of an enemy. By some strange oversight, a few standard works of great merit have been omitted, but the omissions are few, and will probably not be found in the next edition.

The author's preface discusses so fully the importance of the study of the history of cavalry as a preparation for the practical employment of it, that it would be well worth publishing as a separate work, in order to give it a more extended circulation.

The Catalogue is divided into two parts, English and French. The books are given under the names of their authors, instead of by their titles. In the index, the dates of publication—beginning with the Cavalry Regulations of Charles the Bold, 1473, and extending to 1893—author's name and title of book are all given in parallel columns.

The title of the book is followed in most cases by a short analysis or description of the scope of the work, as for example:

JOURNAL OF THE UNITED STATES CAVALRY ASSOCIATION.

The only journal in the English language specially devoted to the interests of the cavalry service, published quarterly, at Fort Leavenworth, Kansas. Up to March, 1892, sixteen numbers have appeared, in five volumes. It is a most valuable publication, and the articles that have appeared from time to time are of great interest. See Part II., under heading "Revue de Cavalerie" for the French cavalry service or professional journal.

The action of the American cavalry in the Civil War may be well studied

in the journal above quoted, and it is impossible that such a struggle, lasting over four years, could have been wanting in valuable lessons in the art of war. Colonel Maurice, in his recent work on "War," draws attention to the fact that the French army, in 1870, owed much of their unprepared state and bad organization to the fact that they had neglected to observe what had taken place in America during the Civil War. In other words, their tactics were based on *data* not recent, but of obsolete application.

The impression is general that American cavalry were only used "dismounted." This is not altogether correct. Of the volunteer mounted regiments raised during the earlier years of the war, although designated as cavalry from the date of their organization, they were in fact mounted infantry, and remained such during the earlier years of the war, but towards the close of the war, in 1864 and 1865, most of these regiments, and especially those with trained and educated leaders, became the truest and best of cavalry, as ready for a fight with sword and pistol mounted against the enemy's cavalry, as for a dismounted fight, if necessary, with dismounted troops.

The reconnaissance in force at Brandy Station, the cavalry fight at Gettysburg, and the charges in Sheridan's Shenandoah campaign, showed what had been learned. Stuart rode around the Army of the Potomac and went wherever he liked in 1862, but in 1863 the Union cavalry had also learned to fight mounted, and from that time things went on quite differently. At the battles of Winchester and Cedar Creek, American cavalry was used with decisive effect in mounted charges against infantry. Finally Stuart, Forrest, Wheeler, Sheridan, possessed in a high degree the characteristics of great cavalry leaders—first consolidating their scattered regiments into one corps command.

CHARLES THE BOLD, DUKE OF BURGUNDY, 1473.

Series of ordinances on cavalry. The first compiled in 1473. Nothing was known of scientific movements until Charles compiled this exercise book. He taught the cavalry to attack in close and extended order; *to link horses and fight on foot.**

Then come the directions as to where the book may be found, etc. As this catalogue is a Government publication, it is not for sale, which is to be sincerely regretted.

SOUVENIRS DU CAPITAINE PARQUIN, 1803–1814. Paris. Boussod, Valadon et Cie. 1892.

The Cavalry Association gladly acknowledges its renewed indebtedness to Mr. Henry T. Bartlett for a copy of the above work.

It would be impossible, in the space available in this JOURNAL, to give an extended notice, much less a critical review, of this magnificent work. Suffice it to say that it recounts in the clearest and most candid manner hundreds of the notable incidents occurring within the personal knowledge of an officer who, according to the accounts of others than himself, played a very distinguished part in the great drama enacted on the Continent from 1803 to 1814.

The continued publication of souvenirs like these has as much as anything else to do, perhaps, with keeping the military spirit of the French people up to a pitch where they are prepared to make any and every sacrifice for the maintenance of an army which they believe, whether rightly or not, is necessary for the preservation of their national existence. A people worthy of having a national

*The italics are not the author's.

existence cannot read of the glorious deeds of their ancestors without being inspired to emulate them, should circumstances make it necessary to do so.

To read the text of this work and see the illustrations cannot help making many a soldier at the present day regret that the romantic side of military life has been completely overwhelmed and buried by the necessities of looking upon war as a purely business matter, with no more poetry or charm than that attending the superintendence of a powder mill.

Captain Parquin's Souvenirs have been published as a veritable *édition de luxe;* the paper and typography are exceedingly beautiful, and the hundreds of illustrations, full-page, double-page, and of smaller sizes, consist of colored lithographs and photogravures, executed in the highest style of art, and give one a perfect idea of the gorgeous and varied uniforms and equipments in use in the days of Napoleon.

OUTPOSTS, PATROLS, ADVANCED AND REAR GUARDS. By Captain James S. Pettit, First U. S. Infantry.

A very complete and satisfactory compilation. Intended, as the author says, principally for the use of those who have neither time nor opportunity for extensive research in military books. The explanations and definitions are clear and concise, and the diagrams, of which there are many, will answer their purpose very well. It is a book that may be made very useful in instructing many of our National Guard organizations, who will not care to devote the necessary time to the study of our authorized text books.

A CONDENSED HISTORY OF THE UNITED STATES, AND A GEOGRAPHY DIRECTORY. By Lieutenant Charles Braden, U. S. Army.

The first has been prepared with the object of assisting candidates for admission to the United States Military or Naval Academies to pass a satisfactory preliminary examination in geography. It is well arranged for assisting the memory to retain the dates of the principal events in our history. The second is a very convenient reference book, and for most persons will answer the purpose of a gazetteer.

SUPPLEMENTARY INDEX TO "FROM EVERGLADE TO CAÑON" WITH THE SECOND DRAGOONS. By General T. F. Rodenburgh, U. S. A. New York, 1893.

The index covers the original work, "Everglade to Cañon," as well as the matter contained in the "Historical Sketch" published by the Military Service Institution. For file with volume.

MILITAER-WOCHENBLATT.

No. 88: General de Miribel. One More Word as to the Overworking of Service Horses. No. 89: The Great Maneuvers at Krasnoe Selo. No. 90: Review of the Imperial Maneuvers in Alsace-

Lorraine. "War, Peace and Culture." Portable Tent Equipment of the Austro-Hungarian Troops. Rules for Exercises of Large Bodies of Cavalry in France. Instruction of Cavalry in Performance of its Strategic Service (from the Russian). No. 91: Review of Imperial Maneuvers in Alsace-Lorraine (continued). Instruction of Cavalry in the Performance of its Strategic Service (continued). No. 92: Military Society of Berlin. No. 93: From the Camp of Krasnoe Selo. No. 94: Military Society of Berlin. Imperial Maneuvers in Alsace-Lorraine (continued). Infantry Firing Regulations of 1893. No. 95: Military Society of Berlin. Infantry Firing Regulations of 1893. No. 96: Imperial Maneuvers in Alsace-Lorraine (continued). Sapper Detachments of the Cavalry Regiments in the Military Districts of Wilna and Warschau. No. 97: The French Maneuvers of 1893. The Use of Machine Guns in the Swiss Cavalry. No. 98: The French Maneuvers of 1893. No. 99: Military Society of Berlin. Imperial Maneuvers in Alsace-Lorraine (concluded). No. 100: Military Society at Berlin. Campaign on the Loire. The Infantry in the Maneuvers of 1893. No. 101: Extent of Fronts in the War of 1870–71. New Service Regulations for the Higher Staffs of the French Army. No. 102: Extent of Fronts in the War of 1870–71. The Great Cavalry Maneuvers in the Military District of Warschau. No. 103: Military Society of Berlin. Extent of Fronts in the War of 1870–71. No. 104: Military Society in Berlin. Moltke's Letters from Turkey. Ideas as to the Use of Troops in Maneuvers. Extent of Fronts in the War of 1870–71. Garrison Exercises of French Reserve Officers. No. 105: Battle of Loigny-Poupry. Extent of Fronts in the War of 1870–71.

REVUE DU CERCLE MILITAIRE.

The French System of Pontons for Infantry. The Maneuvers of 1893 (continued). No. 41: The Maneuvers of 1893 (continued). No. 42: Three Outpost Maneuvers by the Eighty-sixth Infantry. The New German Field Fortification Regulations. No. 43: The Russian Volunteers and Night Combats. The Maneuvers of 1893. No. 44: The Problem of Mounted Infantry Solved by the Employment of the Bicyclette. The New German Field Fortification Regulations. No. 45: The Irregular Troops of the Chinese Army. No. 46: A Maneuver of Instructions for the Officers of the Reserve and Territorial Army. No. 47: Spain in Morocco. The Problem of Mounted Infantry Solved by the Employment of the Bicyclette (continued). No. 48: The Irregular Troops of the Chinese Army. The Problem of Mounted Infantry Solved by the Employment of the Bicyclette (continued). No. 49: The same (continued). No. 50: The same (continued). The New German Field Fortification Regulations. No. 51: Spain in Morocco. Mobilization of the Spanish Army. The Problem of Mounted Infantry Solved by the Employment of the Bicyclette (continued). No. 53: The same continued (with illustrations of the bicyclette folded so as to be carried easily on the soldier's back when thought necessary). The Maxim Gun and the Swiss Cavalry.

JOURNAL OF THE ROYAL UNITED SERVICE INSTITUTION.

October: Dress and Equipment (with practical illustrations), by Colonel H. M. Bengough, C. B. Mobilization for Home Defense, by Major F. G. Stone, R. A., Brigade Major S. E. District. November: Tactical Deductions from the Recent Skeleton Exercises, Near Reading, by Lieutenant-Colonel W. W. M. Smith, R. A., Major E. Satterthwaite, Second V. B. R. W. Kent Regiment, and Colonel C. H. Coles, First London Volunteer Artillery. December: Lobell's Annual Reports on the Changes and Progress in Military Matters during 1892, compiled by Colonel H. T. Hildyard, Commandant Staff College.

PROCEEDINGS OF THE ROYAL ARTILLERY INSTITUTION.

October: Tactical Problems, by Captain J. E. Edmunds, R. E. Self-Adjusting Lanyard for Field Artillery (with fuze-key attached), by Lieutenant C. B. Simonds, R. H. A. November: A Proposal for the Supply of Ammunition in the Field, by Major R. Wynyard, R. A. Note on Infantry Tactics, by Lieutenant-General Sir W. J. Williams, K. C. B. A Visit to Aspen and Wagram, being an account of the passage of the Danube by Napoleon in 1809, by Major E. S. May, R. A. (with map). Clipping of Troop Horses, by Major G. R. Challenor, R. A.

OUTING.

October: Sketching Among the Sioux, by Man-Afraid-of His-Name. The National Guard of Pennsylvania and Its Antecedents, by Captain C. A. Booth, U. S. A. November: The Government Scout, (with portrait of the author), by Captain Jack Crawford. The National Guard of Pennsylvania and Its Antecedents, by Captain C. A. Booth, U. S. A. December: Continuation of the same.

THE UNITED SERVICE. Hamersly & Co.

November: A True History of the Army at Fort Fisher, by Brevet Colonel H. C. Lockwood, Aide-de-Camp to General Ames. Reorganization of the Artillery, by Lieutenant Alvin H. Sydenham, Fifth U. S. Artillery. December: Recent Army Legislation, by G. W. Baird, Major, U. S. A. Frontier Service in the Fifties, by W. B. Lane, Brevet Lieutenant-Colonel, U. S. A.

JOURNAL OF THE MILITARY SERVICE INSTITUTION, U. S. November.

Army Organizations, by Colonel Sanger. Field Works in Military Operations, by Lieutenant Parmeter. A Proper Artillery Field Armament, by Lieutenant Birkhimer. Proper Equipment of Officers, by Lieutenant Brown. Organization of the Armies of Europe, by Captain O'Connell.

JOURNAL OF THE UNITED STATES ARTILLERY. October.

Artillery Difficulties in the Next War (concluded), by Lieutenant Ruckman. Shrapnel Fire for Field Artillery, by Lieutenant Gibson, Ordnance Department. The Artillery Fire Game, (translation—concluded), by Lieutenant Wisser.

JOURNAL OF THE UNITED SERVICE INSTITUTION OF INDIA.

July: Prize Essay Gold Medal for 1892–93. Mountain Warfare as Applied to India, by Major G. M. Bullock, Devonshire Regiment. August: Army Gymnastics, by Major Hon. A. E. Dalzell, Oxfordshire L. I., Inspector of Gymnastics, Bengal.

THE FIRST MAINE BUGLE. October.

The First Cavalry Battle at Kelly's Ford, by Major Frank W. Hess. The Country for Which You Fought, by Lieutenant Edward P. John. With the First Maine, by Riley L. Jones.

THE IOWA HISTORICAL RECORD. October.

Early Recollections of Iowa City, by S. Murdock.

PROCEEDINGS OF THE U. S. NAVAL INSTITUTE. Vol. XIX., No. 3.

THE WESTERN SOLDIER. Monthly. San Francisco, Cal.

THE RIDER AND DRIVER. Monthly. New York.

OUR ANIMAL FRIENDS.